

YALE
MEDICAL LIBRARY



GENERAL MEDICAL
LIBRARY

PROCEEDINGS
OF THE
CONNECTICUT
STATE MEDICAL SOCIETY
1909

117th ANNUAL CONVENTION

HELD AT

HARTFORD, MAY 26th and 27th

EDITOR

WALTER R. STEINER

ASSISTANTS

FREDERICK B. WILLARD

CHARLES J. BARTLETT

PUBLISHED BY THE SOCIETY

The Connecticut State Medical Society does not hold itself responsible for the opinions contained in any article unless such opinions are indorsed by special vote. All communications intended for the Connecticut State Medical Society should be addressed to Walter R. Steiner, M.D., Hartford, Conn.

The next annual meeting of the Connecticut State Medical Society will be held in New Haven, May 25th and 26th, 1910.

TABLE OF CONTENTS.

	PAGE
OFFICERS OF THE SOCIETY, 1909-10,	1
COMMITTEES OF THE SOCIETY, 1909-10,	2
MEMBERS OF THE HOUSE OF DELEGATES, 1909,	4
MINUTES OF THE HOUSE OF DELEGATES, .	7
Report of the Secretary,	7
Report of the President,	11
Report of the Chairman of the Council,	12
Report of the Councilors:	
(a) Hartford County,	19
(b) New Haven County,	21
(c) New London County,	24
(d) Fairfield County,	24
(e) Windham County,	24
(f) Litchfield County,	27
(g) Middlesex County,	29
(h) Tolland County,	30
Report of the Treasurer,	30
Report of the Committee on Public Policy and Legislation,	32
Report of the Committee on Medical Examinations and Medical Education,	34
Report of the Committee on Scientific Work,	45
Report of the Committee on Honorary Members and Degrees,	48
Report of the Committee on Arrangements,	49
Report of the Committee on Prevention of Venereal Diseases,	49
Report of the Committee on a Colony for Epileptics in Connecticut,	50
Report of the Delegates to the American Medical Association in 1908,	51
Report of the Member of the National Legislative Council,	58
Miscellaneous Business,	60
Election of Officers,	65
Tax Laid for Ensuing Year,	67
BANQUET,	73
PRESIDENT'S ADDRESS,	75

Scientific Programme.**Papers on Special Subjects.**

Bacterial Vaccines in the Treatment of Disease. C. J. Bartlett, M.D., New Haven,	89
DISCUSSION,	101
Venesection and Dermatology. Thomas M. Bull, M.D., Nauga- tuck,	104
DISCUSSION,	109
Localization of Lesions of the Genito-Urinary Tract. Frank H. Coops, M.D., Bridgeport,	111
DISCUSSION,	122
Ocular Evidences of Systemic Disease. M. H. Gill, M.D., Hart- ford, Conn.,	127
DISCUSSION,	137
Partial Responsibility of the Insane. Frederick T. Simpson, M.D., Hartford, Conn.,	141
DISCUSSION,	148

Medical Papers.

Hemolysis in the Diagnosis of Malignant Neoplasms. Harold Sears Arnold, M.D., New Haven, Conn.,	155
DISCUSSION,	164
The Influence of the Thoughts and Emotions in the Causation of Disease. Samuel D. Gilbert, M.D., New Haven, Conn.,	167
DISCUSSION,	178
The Physician as an Educator in Sanitation. Frank E. Guild, M.D., Windham, Conn.,	185
DISCUSSION,	189
Appendicitis during Pregnancy. Otto G. Ramsay, M.D., New Haven, Conn.,	193
DISCUSSION,	201

Surgical Papers.

Ectopic Gestation. P. H. Ingalls, M.D., Hartford, Conn.,	207
DISCUSSION,	217
Importance of More Careful Diagnosis and the Aid Afforded by Various Tests. Harris F. Brownlee, M.D., Danbury, Conn.,	220
DISCUSSION,	233
Heredity and Crime: A Study in Eugenics. William H. Carmalt, M.D., New Haven, Conn.,	240
DISCUSSION,	277

Compensatory Hypertrophy of the Small Intestine following Resection of Large Portions of the Jejunum and Ileum.	
Joseph Marshall Flint, M.D.,	283
DISCUSSION,	333
Some Practical Points in the Administration of Anesthetics.	
Richard F. Rand, M.D.,	336
DISCUSSION,	343
PAPERS READ AT COUNTY MEETINGS,	345

Obituaries.

Lewis Barnes of Oxford, by Frank A. Benedict of Seymour,	355
Edwin Bidwell of Deep River, by Arthur M. Pratt of Deep River,	357
Charles Carrington of Farmington, by George F. Lewis of Collinsville,	359
Franklin Pierce Clark of Danbury, by Nathaniel Selleck of Danbury,	361
Alfred Russell Goodwin of Vernon, by Eli P. Flint of Rock- ville,	365
Andrew Bennett Gorham of Wilton, by Howard P. Mansfield of Ridgefield,	369
Elias Buel Heady of Milford, by Albert F. Tuttle of Milford,	371
T. Morton Hills of Willimantic,	374
Charles Henry Hubbard of Essex, by Frederick B. Bradeen of Essex,	376
C. J. Leclair of Danielson, by William H. Judson of Danielson,	377
Timothy McCarthy of Rockville, by Eli P. Flint of Rockville,	378
Gurdon Wadsworth Russell of Hartford, by Edward K. Root of Hartford,	380
Frederick Spring of Naugatuck, by Thomas M. Bull of Naug- atuck,	383
Thomas Francis Stanton of Bridgeport, by Edward M. Smith of Bridgeport,	384

Charter and By-Laws,	387
--------------------------------	-----

Members of Society.

Honorary Members,	409
Active Members (by Counties), with Post Office Address,	410
List of Former Officers of the Society,	430
Alphabetical List of Living Members, with Degrees and Date of Graduation,	433

OFFICERS OF THE SOCIETY.

1909-1910.

President.

SAMUEL D. GILBERT, New Haven.

Vice Presidents.

THEODORE R. PARKER, Willimantic.

WILLIAM J. TRACEY, Norwalk.

Secretary.

WALTER R. STEINER, Hartford.

Treasurer.

JOSEPH H. TOWNSEND, New Haven.

COMMITTEES.

STANDING COMMITTEES.

COMMITTEE ON SCIENTIFIC WORK.

George Blumer. John W. Wright.
The Secretary.

COMMITTEE ON MEDICAL EXAMINATIONS AND MEDICAL EDUCATION.

Horace S. Fuller. Walter L. Barber.
J. Francis Calef. Charles A. Tuttle.
Samuel M. Garlick.

COMMITTEE ON PUBLIC POLICY AND LEGISLATION.

Everett J. McKnight. Elias Pratt.
Charles J. Foote. Charles C. Gildersleeve.
Leone F. LaPierre. Charles E. Stanley.
Frederick M. Wilson. Eli P. Flint.
The President. The Secretary.

COMMITTEE ON HONORARY MEMBERS AND DEGREES.

Edmund P. Douglass. Phineas H. Ingalls.
William S. Hulbert.

SPECIAL COMMITTEES.

COMMITTEE ON A COLONY FOR EPILEPTICS IN THE STATE.

Max Mailhouse. Edwin A. Down.
Allen R. Diefendorf. Frank K. Hallock.
The President.

COMMITTEE ON NATIONAL LEGISLATION.

Everett J. McKnight.

DELEGATES.

DELEGATES TO THE AMERICAN MEDICAL ASSOCIATION.

D. Chester Brown.
Everett J. McKnight.

DELEGATES TO STATE ASSOCIATIONS.

MAINE.

J. M. Keniston, Middletown. F. T. Simpson, Hartford.

NEW HAMPSHIRE.

F. N. Loomis, Derby. R. W. Kimball, Norwich.

VERMONT.

George Sherrill, Stamford. R. S. Goodwin, Thomaston.

MASSACHUSETTS.

George Blumer, New Haven. J. F. Calef, Middletown.

RHODE ISLAND.

H. H. Heyer, New London. R. C. Paine, Thompson.

NEW YORK.

F. T. Brooks, Greenwich. F. H. Lee, Canaan.

NEW JERSEY.

J. G. Gregory, Norwalk. W. F. Verdi, New Haven.

PENNSYLVANIA.

H. G. Howe, Hartford. Eli P. Flint, Rockville.

HOUSE OF DELEGATES.

COUNCILORS.

HARTFORD COUNTY.

OLIVER C. SMITH (re-elected).

NEW HAVEN COUNTY.

CHARLES S. RODMAN.

NEW LONDON COUNTY.

EDWARD P. BREWER (re-elected).

FAIRFIELD COUNTY.

GOULD A. SHELTON.

WINDHAM COUNTY.

FRANK E. GUILD.

JOHN B. KENT (councilor-elect).

LITCHFIELD COUNTY.

EDWARD H. WELCH.

MIDDLESEX COUNTY.

FRANK K. HALLOCK.

JAMES M. KENISTON (councilor-elect).

TOLLAND COUNTY.

THOMAS F. ROCKWELL.

DELEGATES.

HARTFORD COUNTY.

Frederick B. Willard.

Erastus P. Swasey.

Harry B. Rising.

Phineas H. Ingalls.

William R. Tinker.

Michael H. Gill.

John H. Rose.

NEW HAVEN COUNTY.

Matthew C. O'Connor.	Edwin H. Johnson.
Augustin A. Crane.	William H. Carmalt.
Charles W. Gaylord.	Harold A. Meeks.
Edward T. Bradstreet.	

NEW LONDON COUNTY.

Dennis J. Shahan.	George M. Minor.
-------------------	------------------

FAIRFIELD COUNTY.

George H. Noxon.	John W. Wright.
Frank W. Stevens.	James D. Gold.
William J. Tracey.	

WINDHAM COUNTY.

Charles C. Gildersleeve.	Robert C. White.
--------------------------	------------------

LITCHFIELD COUNTY.

Robert Hazen.	William S. Hulbert.
---------------	---------------------

MIDDLESEX COUNTY.

Charles E. Stanley.	Charles B. Young.
---------------------	-------------------

TOLLAND COUNTY.

Frederick W. Walsh.

STANDING COMMITTEES.

COMMITTEE ON PUBLIC POLICY AND LEGISLATION.

Everett J. McKnight.	Elias Pratt.
Charles J. Foote.	Charles C. Gildersleeve.
Leone F. LaPierre.	Charles E. Stanley.
Frederick M. Wilson.	Eli P. Flint.
The President.	The Secretary.

COMMITTEE ON MEDICAL EXAMINATIONS.

Horace S. Fuller.	Walter L. Barber.
J. Francis Calef.	Charles A. Tuttle.
Samuel M. Garlick.	

COMMITTEE ON SCIENTIFIC WORK.

Oliver C. Smith.	Rush W. Kimball.
The Secretary.	

PROCEEDINGS.

COMMITTEE ON HONORARY MEMBERS AND DEGREES.

William G. Daggett. Henry S. Noble.
Charles B. Graves.

COMMITTEE OF ARRANGEMENTS.

Frederick S. Crossfield. Frederick B. Willard.
Charles A. Goodrich.

SPECIAL COMMITTEES.COMMITTEE TO CONSIDER THE BEST METHODS OF PUBLIC CONTROL AND
PREVENTION OF VENEREAL DISEASE.

Ralph A. McDonnell. William H. Donaldson.
Jay W. Seaver. Frank H. Wheeler.
Charles S. Stern.

COMMITTEE ON A COLONY FOR EPILEPTICS IN THE STATE.

Max Mailhouse. Edwin A. Down.
Allen R. Diefendorf. Frank K. Hallock.
The President.

COMMITTEE ON PSYCHOPATHIC WARDS IN GENERAL HOSPITALS.

Allen R. Diefendorf. Max Mailhouse.
Frederick T. Simpson. D. Chester Brown.
J. Reed Topping.

COMMITTEE ON NATIONAL LEGISLATION.

Everett J. McKnight.

MINUTES OF THE HOUSE OF DELEGATES.

The first meeting of the House of Delegates was called to order on Wednesday, May 26, at eleven o'clock, at the Hunt Memorial Building, 38 Prospect Street, Hartford, by the President, Dr. Seldom B. Overlock of Pomfret. There were present Dr. Oliver C. Smith, Dr. Charles S. Rodman, Dr. Gould A. Shelton, Dr. Frank E. Guild, Dr. Edward H. Welch, Dr. Frank K. Hallock and Dr. Thomas F. Rockwell (councilors), and Dr. Frederick B. Willard, Dr. Harry B. Rising, Dr. William R. Tinker, Dr. Erastus P. Swasey, Dr. Phineas N. Ingalls, Dr. Michael H. Gill, Dr. John H. Rose, Dr. Matthew C. O'Connor, Dr. Augustus A. Crane, Dr. Edwin H. Johnson, Dr. William H. Carmalt, Dr. Harold A. Weeks, Dr. Edward T. Bradstreet, Dr. Dennis J. Shahan, Dr. George M. Minor, Dr. Frank W. Stevens, Dr. John W. Wright, Dr. James D. Gold, Dr. Charles C. Gildersleeve, Dr. Robert C. White, Dr. Robert Hazen, Dr. Charles E. Stanley and Dr. Frederick W. Walsh (delegates), the President, Dr. Seldom B. Overlock, and the Secretary, Dr. Walter R. Steiner. The following reports were then read and accepted.

(1) Report of the Secretary, Dr. Walter R. Steiner (Hartford) :

REPORT OF THE SECRETARY.

Mr. President and Gentlemen of the House of Delegates:

During the past year Dr. Nathaniel E. Wordin of Bridgeport, one of our former Presidents and for sixteen years our Secretary, sent me an early license to practice medicine in this State, which he had in his keeping. It was issued by the Connecticut State Medical Society in 1796 and contains an impression of the seal of the society, being the earliest copy of the seal with which I am acquainted. Accordingly I have had it photographed and enlarged. The enlargement has been used

as a pattern, to follow as faithfully as possible, for our new seal, in which the word "state" has been inserted. To do this, it has been necessary to abbreviate our title on the seal. Through the coöperation of Prof. J. W. D. Ingersoll of the Latin Department of Yale University, this has been done, and the new seal will now be used on all the licenses to practice medicine, which we issue.

Our membership, including the twenty-one honorary members, shows an increase of fourteen over that of last year, making our total number now 863. The Hartford County Association has added the most new members, the number being nineteen. New Haven comes next with eight, Fairfield follows with six, Middlesex and New London with four, Windham and Tolland with three, and Litchfield with two. The names of the new members in the County Associations, with graduation and places of residence, we give below. They number forty-nine in all.

John Leopold North, Univ. Louisville, 1894, South Manchester.
 George William May, Milwaukee Med. School, 1895, South Manchester.
 Maurice Washington Maloney, Jefferson Med. School, 1897, New Britain.
 George Bagg Driggs, Yale, 1897, Hartford.
 Andrew Mansergh Outerson, Jefferson, 1906, Hartford.
 Charles Brigham Chedel, Dartmouth, 1906, Kensington.
 Hubert Daniel Brennan, Univ. Vt., 1892, Bristol.
 Charles Herbery Borden, P. & S., N. Y., 1896, Hartford.
 Michael James Morrissey, P. & S., Balt., 1897, Unionville.
 Timothy Gratton O'Connell, Yale, 1899, Bristol.
 Harry Rabe Sharpe, Univ. Vt., 1900, Manchester.
 Sheldon Samuel Stratton Campbell, Univ. Vt., 1902, Collinsville.
 Bartholomew Francis Donohue, Yale, 1903, Wethersfield.
 John Francis Rooney, Balt. Med. School, 1903, Hartford.
 John Purney, Balt. Med. School, 1906, New Britain.
 George Houghton Bodley, Yale, 1907, New Britain.
 Hugh Francis Flaherty, Yale, 1907, Hartford.
 George Arthur Smith, Johns Hopkins, 1907, Hartford.
 Benedict Nolasco Whipple, Yale, 1907, Bristol.
 William Joseph Barrett, Md. Med. Col., 1904, New Haven.
 John Harrold Buffum, Univ. Vt., 1898, Wallingford.
 Herman Philip Hessler, Yale, 1903, New Haven.
 Stephen Francis Donovan, P. & S., Balt., 1902, Derby.

The President

of the Connecticut Medical Society

To whom these presents may come greeting.

Know Ye that Thomas Morse the Doctor in law of
hath been approved relative to his knowledge in Physics
on examination according to the rules and regulations established
by the Fellows of the Connecticut Medical Society. I do therefore hereby
licence him to practise as a Physician -- with all the rights
privileges and honours thereunto appertaining, and do recommend
him to the notice of the Faculty, and the improvement of the Public.

In Testimony whereof I have hereunto set my hand and
have caused the Seal of the said Society to be hereunto affixed at
New Haven in the State of ~~the~~ ^{the} day of ~~Sept~~ ^{Sept} in the year of our Lord 1794 --
of American Independence the 20th

Committee for the
County of Windham

Joseph B. Baker
John V. Hall

Lucas Munson, President

Addison Julius Tanner, Univ. N. Y., 1894, Meriden.
 Arthur Francis McDonald, P. & S., N. Y., 1905, Waterbury.
 Jacob Hancher, L. I. Hosp. Col., 1906, Waterbury.
 Burton Isaac Tolles, Yale, 1904, New Haven.
 Ernest Oliver Winship, Univ. Vt., 1900, New London.
 William Bradford Casey, Univ. Md., 1906, Norwich.
 Stuart Johnston Lawson, Univ. Va., 1905, New London.
 Ellis King Devitt, Md. Med. Col., 1907, Lyme.
 Gilbert Tyson Smith, Univ. of Md., 1897, Stamford.
 Charles Harry Sprague, P. & S., N. Y., 1904, Bridgeport.
 Daniel Cleveland Patterson, P. & S., Balt., 1906, Bridgeport.
 Charles Reed Pratt, Yale, 1905, Bridgeport.
 Edward Oliver Parker, P. & S., N. Y., 1896, Greenwich.
 Thomas Jacob Biggs, Ohio Med. Col., 1887, Stamford.
 Louis Irving Mason, P. & S., N. Y., 1891, Willimantic.
 Joseph N. Landry, Laval, 1901, Putnam.
 W. P. Stuart Keating, Jefferson, 1899, Willimantic.
 Almon W. Pinney, Hahnemann, Phila., 1900, Norfolk.
 Louis J. Pons, Univ. Vt., 1885, Roxbury.
 Louis Raymond Brown, Tufts, 1907, Middletown.
 Charles Clarence Davis, Yale, 1907, Essex.
 John W. Parker, Yale, 1906, Westbrook.
 Felix Percy Chillingworth, Yale, 1907, Haddam.
 James Green Burr, Univ. Balt., 1893, Middlefield.
 Francis McLean Dickinson, P. & S., N. Y., 1905, Rockville.
 Wright Butler Bean, P. & S., N. Y., 1895, Rockville.
 John Patrick Hanley, Cornell, 1906, Stafford Springs.

The largest gain in the County Associations is seen in Hartford, with a net gain of sixteen; New London follows with a gain of five; Fairfield, Windham and Middlesex with a gain of one respectively; Litchfield presents a loss of two, Tolland of one and New Haven of five. We have lost during the year forty members, distributed as follows: By death, fifteen (including two honorary members, Dr. William McCullom of Brooklyn, N. Y., and Dr. William T. Bull of New York, N. Y.); by removal seven; by suspension sixteen; by expulsion one; by resignation three. Our total number is distributed among the counties as follows:

STATEMENT OF COMPONENT COUNTY ASSOCIATIONS.

Membership	County Associations	New Members	Reinstatement	By Transfer	Deceased	Removed	Resigned	Suspended	Expelled	Gain in Membership	Loss in Membership
224	Hartford County.....	19	1	1	2	0	0	0	1	16	0
232	New Haven County...	8	9	0	2	3	2	15	0	0	5
61	New London County..	4	0	0	0	0	0	0	0	5	0
163	Fairfield County.....	6	1	2	3	0	0	0	0	1	0
39	Windham County....	3	0	0	2	0	0	0	0	1	0
58	Litchfield County.....	2	0	0	0	3	0	0	0	0	2
43	Middlesex County....	4	0	0	2	1	1	0	0	1	0
22	Tolland County.....	3	0	3	2	0	0	0	0	0	1
842		49	11	6	13	7	3	16	1	33	8

Death has removed three ex-Presidents during the past year, one of whom it was my privilege to know quite well. The obituary of Gurdon Wadsworth Russell will record his life, so it is unnecessary for me to dwell upon it. Its impress will long be felt in our profession in Hartford. We should here recall his duties to the State Society, for he served as its Secretary three years, being first elected sixty-three years ago and twenty-four years later became our President. He loved unity, peace and concord, and so he walked in and out amongst us, strengthening the bonds of friendship among the profession in his town and establishing them, if none existed, until "God's finger touched him and he slept." He loved the history of medical affairs in this State and made no small contributions to them, but, best of all, he loved this Society and showed his signal devotion by leaving \$5,000 of his wealth to it.

Lack of funds has hindered the preparation of the card index as well as the cataloguing and binding of our state journals.

The experiment of a semi-annual meeting in the fall with one of the County Associations was a great success. It brought many from different parts of the State to New London and we hope it was a stimulus to the County Association whose guests we were.



ENLARGED COPY OF THE SEAL, TAKEN FROM THE PRECEDING LICENSE.

The proceedings of our Society have appeared in the *Yale Medical Journal*, and were also published in book form, both of which the members have received, as per agreement.

Respectfully submitted,

WALTER R. STEINER.

(2) Report of the President, Dr. Seldom B. Overlock (Pomfret):

REPORT OF THE PRESIDENT.

Gentlemen of the House of Delegates:

The Society is to be congratulated that there are so many delegates present at this the first session of the House of Delegates. You are the members of the State Society to whom is intrusted the transaction of the business of the session. Every man when elected by his county to be a representative in this body should pledge himself to be present at each and every session, otherwise he should not accept the position. It is certain that there is, each year, more care in this matter, consequently more of the delegates arrive here in season to attend the opening session than formerly. A wider interest is being taken in the proceedings of this body and more and better work is accomplished.

The President's report includes a general summing up of medical work and progress in the State during the year. Special matters are in the hands of the Council and the several committees to whom they were assigned at the last annual meeting. They will report these in detail. Among these are the various bills before the State Legislature in which the State Society and the Medical profession are actively and vitally interested.

I have been present at one meeting, at least, in each county during the year. It may be said without reservation, that these meetings have been successful. Attendance has varied in the different counties, but on the whole, a good percentage of the members in each county have been present at the meeting of their County Association.

Besides the usual matters that are brought up for discussion at county meetings, the contract system has been given considerable prominence in several counties. In some counties this seems still to be regarded as a "local issue." It seems certain, however, that soon all will fall into line and refuse to admit that any body of men shall fix the physician's fee.

In the preparation of the literary programme the county meetings have followed one of three plans. In one county, all the papers were read by men from without the county; in others, one paper was by a man from outside and the rest of them by local men; in the remainder, the entire work was done by members of the Association of the county in which the meeting was being held. It is evidently a mistake for any County Association to depend on outside talent to furnish the entire material for their annual, or even their semi-annual, meeting. At the latter there may, perhaps, be less objection to this especially in the smaller counties, where the members do not have a frequent opportunity to hear men read papers on special subjects.

There has been steady and marked improvement in the character of the county meetings during the last ten years. This has been especially noticeable during the last five years. During the latter period every county has had a good programme prepared and the members have attempted to do justice to the part assigned to each in this programme. Never before has there been such a unity in endeavor to forward medical work in the State as at present. On the whole I am able to report increasing interest in medical matters everywhere within the jurisdiction of this Society.

(3) Report of the Chairman of the Council, Dr. Frank K. Hallock (Cromwell):

REPORT OF THE CHAIRMAN OF THE COUNCIL.

Mr. President and Gentlemen of the House of Delegates:

The present Board of Councilors met for organization and final business on the last day of the annual session of this

Society, May 28, 1908. Dr. F. K. Hallock was elected Chairman. Drs. C. S. Rodman and G. A. Shelton were appointed the Auditing Committee. The Secretary, Dr. Walter R. Steiner, was elected Editor of the Transactions, with Drs. F. B. Willard and C. J. Bartlett as assistants. The salary of the Secretary for the ensuing year was fixed at \$150.00.

According to custom, the two stated meetings of the Board have been held—the first in March, preliminary to the spring meetings of the County Associations; and the second in May, one week before the annual meeting of the State Society.

It has been the practice for the past two years to present at the March meeting every possible item of business which the Council had to consider, but not to take final action thereon until the second meeting in May. At this latter session of the Board, all previous votes and recommendations are reconsidered, formally ratified and prepared for presentation to the House of Delegates. This method has been found to work well. It insures, first, a full attendance of the members of the Council by reason of the importance of each meeting; secondly, all matters coming before the Board receive full and careful consideration; and thirdly, the transaction of business is expedited satisfactorily.

It is with considerable satisfaction that the Council is able to report the successful outcome of the two experiments undertaken by this Society during the past year. The publication of the Transactions through the medium of the *Yale Medical Journal* and the holding of the fall meeting of the State Society in conjunction with a County Association were certainly radical departures from ancient custom. From all parts of the State have come expressions of approval at the well-edited and neat appearance of the *Yale Medical Journal*; while the bound copy of the Proceedings is generally acknowledged to surpass all recent volumes in quality, of type, paper and general make-up. The joint session of the State Society and the New London County Medical Association, held in New London, October 29, 1908, was well attended. A most excellent spirit of good-fellowship prevailed and the character

of the literary and scientific work was very satisfactory. The universal opinion of those present was to the effect that the meeting was entirely a successful venture and the Council has, therefore, arranged for the State Society to hold future joint meetings as follows :

With the Fairfield County Association, at Bridgeport, in October, 1909.
With the Middlesex County Association, at Middletown, in October, 1910.

With the Litchfield County Association, at a place to be later designated, in October, 1911.

The following amendment of Chapter X of the By-Laws is approved by the Council and is herewith presented for your consideration :

The clause in Chapter X now reads :

The amount of the assessment shall be fixed by the House of Delegates, but shall not exceed the sum of \$3.00 per capita per annum, except on a four-fifths vote of the delegates present.

Chapter X amended as proposed will read :

The amount of the annual assessment per member shall be fixed by the House of Delegates.

The following amendment of Chapter XIV of the By-Laws, suggested by Dr. Rodman and approved by the Council, is herewith presented for your consideration :

Chapter XIV now reads :

"These By-Laws may be amended at any Annual Session by a majority vote of all the delegates present at the session, after the amendment has been laid on the table for one day."

Chapter XIV amended as proposed will read :

"These By-Laws may be amended at any Annual Session by a majority vote of all delegates present at that session, after the amendment has been laid on the table until the next annual session. If, however, the proposed alteration has been published in the notice of the session, it may be acted upon after it has been laid on the table one day."

The two recommendations of the New Haven Medical Society concerning "Medical Expert Testimony" and "Privi-

leged Communications," see pages 57 and 58, Proceedings of 1908, were presented to the House of Delegates a year ago and by that body referred to the Committee on Public Policy and Legislation. At the request of this latter committee the Board of Councilors has carefully considered the two recommendations with the following results: First, approval of action being taken relative to the passage of an act concerning "Expert Testimony," and second, disapproval, at this time, of action being taken relative to the enactment of a law concerning "Privileged Communications." The reason for disapproval of the second recommendation is uncertainty as to the interpretation of existing statutes, some legal authorities claiming that under present laws the communications of physicians are already privileged.

In regard to the first recommendation the Council offers for your consideration the following:

AN ACT
CONCERNING MEDICAL EXPERT TESTIMONY.

Be it Enacted by the Senate and House of Representatives in General Assembly Convened:

SECTION 1. Any judge of the Superior Court may, upon his own initiative or upon the request of either party to any action involving medico-legal questions, appoint a commission of one or more physicians to act as experts.

SECTION 2. Only physicians who are graduates of some reputable school of medicine and have been in practice at least five years, shall be eligible to appointment to such commission.

SECTION 3. Such commission shall act as medical experts concerning any question that may arise in the trial of such action, and, whenever requested by the Court to do so, shall express an opinion as to the significance of other medical testimony offered in such trial.

SECTION 4. The compensation for the members of such commission shall be fixed by the Court and paid by the State.

The above act was prepared with the assistance of Judge Lucien F. Burpee of Waterbury, and if approved by the House of Delegates the Council would recommend an immediate effort to be made by the Committee on Public Policy and Legislation to obtain its passage by the present Legislature.

The Council would call attention to the fact that the amendment to Section 1, Chapter III of the By-Laws, passed at the annual session of the House of Delegates, 1908, is null and void for the reason that including the two Vice Presidents and the Treasurer as members of the House of Delegates, *ex officio*, is contrary to the provisions of Section 3 of the Charter.

Eight hundred forty-seven volumes of the Transactions for 1908 have been distributed to members of this Society, to medical libraries and to all those entitled to receive them.

One hundred fifty-three copies remain in the office of the Secretary. The total expense for the 1908 issue of the Transactions has been \$2,250. The amount expended for general printing, stationery, etc., in transacting the business of the Society for the past year was \$35.75.

The Auditing Committee, Drs. C. S. Rodman and G. A. Shelton, has examined the accounts of the Treasurer and found them correct. The balance of funds on hand is \$1,353.44. The amount of taxes due and uncollected is \$393.00, as against \$390.00 last year.

The Council would advise a tax of \$3.00 per member for the ensuing year.

As the Nominating Committee, the Councilors present the following nominations:

NOMINATIONS.

President.

SAMUEL D. GILBERT, *New Haven.*

Vice Presidents.

THEODORE R. PARKER, *Willimantic.*

WILLIAM J. TRACEY, *Norwalk.*

Secretary.

WALTER R. STEINER, *Hartford.*

Treasurer.

JOSEPH H. TOWNSEND, *New Haven.*

Committee on Scientific Work.

George Blumer, *New Haven.* J. W. Wright, *Bridgeport.*
The Secretary.

Committee on Medical Examinations and Medical Education.

WALTER L. BARBER, *Waterbury.*

Committee on Public Policy and Legislation.

E. J. McKnight, <i>Hartford.</i>	Elias Pratt, <i>Torrington.</i>
C. J. Foote, <i>New Haven.</i>	C. C. Gildersleeve.
L. F. LaPierre, <i>Norwich.</i>	C. E. Stanley, <i>Middletown.</i>
F. M. Wilson, <i>Bridgeport.</i>	E. P. Flint, <i>Rockville.</i>

Committee on Honorary Members and Degrees.

E. P. Douglas, <i>Groton.</i>	P. H. Ingalls, <i>Hartford.</i>
William S. Hulbert, <i>Winsted.</i>	

Delegates to the American Medical Association.

D. Chester Brown.	E. J. McKnight.
-------------------	-----------------

Delegates to State Associations.

Maine.

J. M. Keniston, <i>Middletown.</i>	F. T. Simpson, <i>Hartford.</i>
------------------------------------	---------------------------------

New Hampshire.

F. N. Loomis, <i>Derby.</i>	R. W. Kimball, <i>Norwich.</i>
-----------------------------	--------------------------------

Vermont.

George Sherrill, <i>Stamford.</i>	R. S. Goodwin, <i>Thomaston.</i>
-----------------------------------	----------------------------------

Massachusetts.

George Blumer, <i>New Haven.</i>	J. F. Calef, <i>Middletown.</i>
----------------------------------	---------------------------------

Rhode Island.

H. H. Heyer, New London. R. C. Paine, Thompson.

New York.

F. T. Brooks, Greenwich. F. H. Lee, Canaan.

New Jersey.

J. G. Gregory, Norwalk. W. F. Verdi, New Haven.

Pennsylvania.

H. G. Howe, Hartford. Eli P. Flint, Rockville.

The presentation of this list of nominations completes my report; but as this session concludes my term of service and as I am the only one remaining of the original Councilors appointed by Dr. Carmalt when he was President in 1905, I may be allowed to add a few final words.

First of all, let me urge upon you the importance of impressing upon the County Associations the great necessity of selecting their best men for Councilors. I mean "best," of course, in a general sense; but especially in the respect of being faithful to their duties in carrying out the highest ideals of the Society.

Secondly, when an efficient man is elected to the Council, encourage your County Association to keep him there a reasonable length of time; at least two terms. This office of Councilor, like that of membership on the Legislative Committee, is too important to be frequently or promiscuously rotated.

Finally, Gentlemen of the House of Delegates, as far as you can conscientiously, be loyal to the Council. Remember that, as the steering committee, so to speak, of the State Society, the problems presented to it are often hard to solve; and that as the nominating committee, it is quite likely to be subject to criticism. It matters not who may be the body of men entrusted with the task of selecting nominees for office, there will always be some to find fault and dissent. This is inevi-

table. It was the same under the old *régime*, when a committee of Fellows prepared the list of nominations; but I am sure that in this respect, as in all others, those of us who have had experience in the old way and in the new, will unhesitatingly testify to the superiority of the present method of procedure. I count it a most happy privilege to be able to say that the men who have composed the Council for the past four years have been actuated by the right spirit, for with earnestness and in harmony at all times and in all ways, they have worked and striven for the supreme good of our honored old Society.

Respectfully submitted,

FRANK K. HALLOCK.

DR. WILLIAM H. CARMALT (New Haven): I move that a committee of three be appointed by the Chair to consider the recommendations in the report of the Chairman of the Council.

Motion adopted.

THE PRESIDENT: I appoint as that committee Dr. William H. Carmalt (New Haven), Dr. John W. Wright (Bridgeport), and Dr. Erastus P. Swasey (New Britain).

(4) Reports of the Councilors from the different counties in the State:

REPORTS OF THE COUNCILORS.

(a) Hartford County, by Dr. Oliver C. Smith:

Mr. President and Members of the House of Delegates:

In closing another year of its long and honorable history the Hartford County Medical Association is grateful for its many blessings. Its membership has increased from two hundred and eight to two hundred and twenty-four, an increase of sixteen members, this being the largest gain made by any county in the State, and entitling us to a representation of seven members in the House of Delegates. Nineteen members have been elected, one has been dropped. The Association has lost two by death, Dr. Gurdon W. Russell of Hartford, and Dr. Robert E. Ensign of Berlin. Dr. Russell died Febru-

ary 3, 1909, in the ninety-fourth year of his age, being the oldest member of both the Hartford County Association and the Connecticut State Medical Society. For more than half a century Dr. Russell had been a bulwark of strength and a constant inspiration to the medical profession of the city of Hartford, Hartford County and the State of Connecticut. Dr. Russell was a general practitioner in its widest sense, and typified the cultivated, kindly, Christian family physician. He was the Medical Director of the great Ætna Life Insurance Company for more than fifty years and held the office at the time of his death. His obituary, written by his associate, Dr. Edward K. Root, will appear in full in the Proceedings for 1909.

Dr. Robert E. Ensign died March 30, 1909, having been a member of the Association forty-nine years. Dr. Ensign was a general practitioner, a gentle, quiet, kindly man, who through a long lifetime gave of the best that was in him to his patients, whose friends were upon every side and whose enemies were nil. He was very regular in his attendance upon our county meetings, and his genial face will be missed by all.

The officers of the Association have endeavored earnestly to include every eligible man in the county in its membership. There are, however, still a few men who have not yet enrolled, and it is earnestly requested of each member to do his utmost to induce such men to join the Association.

The two meetings of the Association have been well attended, eighty-two being present at the fall meeting, and ninety-six at the spring meeting, this being the largest attendance in the history of the Association. The papers and discussions have been of marked scientific and practical interest.

The feeling concerning contract work was strongly expressed in the vote cast at the spring meeting, tabling the application of the practitioner who agreed to drop his society work *if* elected, the Association feeling that he should drop his society work first.

Dr. Charles M. Wooster as President has administered the affairs of the Association in an excellent manner, leaving

nothing undone that lay in his power to keep up the standard of the work and make the meetings attractive and profitable.

Dr. Frederick B. Willard, as usual, has been a most faithful and diligent worker as clerk.

There have been during the year no bickerings nor dissensions, each member has been conscious of the progress and welfare of the Association and each more than ever seems to be willing to give his aid and lend his energies to further its interests. Obviously, the more this is true, the greater becomes the power of the organization for doing good, both by our own advancement and in our usefulness to the public which we serve.

Respectfully submitted,

OLIVER C. SMITH.

(b) New Haven County, by Dr. Charles S. Rodman:

Mr. President and Gentlemen of the House of Delegates:

During the past year, New Haven has needed no Councilor as defined by the National Association. All has been harmonious. Citations from the first Council reports are applicable:

"There are still those healthy differences of opinion which stimulate and broaden thought, eliminate error, and bring us nearer truth." "There seems to be acceptance of the majority rule, and it has always been made unanimous."

In 1907, our State Secretary credited us with two hundred and eight members, exclusive of nineteen in arrears, therefore suspended, dropped, or "expelled." In 1908, he changed two hundred and eight to two hundred and three, an unexplained loss of five. He then reinstated thirteen, expelled four, and suspended none, a good showing, but the Secretary of our County, last April (27th), reports reinstatement of nine.¹ The inconsistencies and fluctuations in our annual census lead one to hope for the coming of the card index

¹ The State Secretary's report is necessarily based upon that of the County Secretary. W. R. S.

and better system in the compilation both in the County and the State.

Leaving the exact changes in our roll call to the secretaries and mathematicians, it may be said in general that the past year, following the panic year, has not been one of numerical growth. There has been practically no change in the number of physicians registered in New Haven County, in the number of our own members, or in that of our city Associations. In response to inquiry, the Secretary of the State Board of Health estimates the number of physicians registered in the county, April 1, 1908, at four hundred and three; April 1, 1909, at four hundred and six. Deaths and removals are not always promptly reported to the Secretary. Of the four hundred, sixty per cent. are members of this Association, while twenty-five per cent. affiliate with no one of the three incorporated State Societies. Nearly one-half of our members are also in the city Association of New Haven, and nearly one-fourth in that of Waterbury. Neither of these local associations has increased its membership during the year. As to ours—the county: During the year we have elected eight members, and lost two by death and five by resignation or removal.

Our scientific work has never been better, as shown in evident careful preparation and in the number who have taken part in it. Subjects for discussion have been selected in which the majority are interested and concerning which they form and can express opinions. Appointments have been made, not wholly of those within or without the county, who engaged in original research, or as editors or teachers are well qualified, but largely also of those who work much and write little. Results have been good and general interest so great that there is little disposition to substitute a more typical post-graduate instruction. Still it is to be regretted that more papers are not offered without solicitation by those who can best prepare them.

Two of the "Objects of the Association," as stated in our Constitution, are:

"To increase among the members their knowledge of scientific and practical medicine";

"To cultivate sociability and friendliness among the members and promote their general welfare."

A word here for our dinners; informal, largely attended. A better one could not be imagined than that given us at the Union League Club in New Haven in October. A better one is not needed than that in Meriden in April. On each occasion about ninety dined after the adjournment. Perhaps the social side attracts some who would not otherwise attend. Even so, it leads to kindlier feelings among members, some of whom are to meet professionally, not socially, for another half year. Here appeal may be taken to our honored guest, the President of the State Society. His well-chosen words at the sessions and the dinners gracefully reminded us of what we should not forget: that ours is a constituent, a part of the greater, the Connecticut Medical Society.

At the April meeting, our Association by a practically unanimous vote reaffirmed and adopted the By-Law of the Connecticut Society barring contract work. Reference may be made to an innovation, at the same time, in the preparation and distribution, before and at the meeting, of a ticket for use in the election of Delegates. Perhaps the precedent then established may be followed in future, by opposing tickets and a check list. Active participation in matters of business and in the election of officers brings to our meetings a larger attendance and those able to promote and lead in the scientific work. It is in line with the policy of the American Medical Association and makes for the election of Delegates mindful of their duty in a faithful attendance at the sessions of the House.

The two members already referred to as having gone before are Dr. Lewis Barnes of Oxford and Dr. Heady of Milford. Their life work was in outlying towns of the county. Their faces and their voices became familiar to us. Their obituaries have been written. It only remains to say of each,

oft the saddest, always the truest words of human language—we miss him.

Respectfully submitted,

C. S. RODMAN.

(c) New London County, by Dr. Edward P. Brewer. Read by the Secretary in the absence of Dr. Brewer:

Mr. President and Gentlemen of the House of Delegates:

The first semi-annual meeting of the Connecticut State Medical Society was held jointly with the New London County Medical Association at New London in October. The excellent programme has been recorded by the State Secretary and requires no detailed notice here, but the result and influence of the joint meeting on the county organization is worthy of note.

Only a few of the members of the County Association have, I believe, attended a meeting of the State Society. Most regard it with indifference and pay their dues with reluctance. But being brought in touch with the State Society has awakened their interest and acquainted them with the good work done and being done for the good of all. If one but becomes acquainted with the arduous and self-sacrificing labors of the Legislative Committee alone, he must of necessity give his cordial support to the State Society.

The April meeting of the County Association reflected the influence of the joint October meeting in a large attendance and a number of applicants for membership. At that meeting the question of coöperative medical defense was discussed and the councilor instructed to favor a plan of medical defense in the Council and annual state meeting.

Professional relations are cordial throughout the county and the regular physician prosperous.

Respectfully submitted,

EDWARD P. BREWER.

(d) Fairfield County, by Dr. Gould A. Shelton:

Mr. President and Gentlemen of the House of Delegates:

Another year of Fairfield's work places on the Councilor the weight of one more burden. It is not a grievous one to bear,

however, since each month of the year now closing has sent to him for record its wireless messages of prosperity, harmony and priceless energy.

The men of our county have infused into the humanitarian part of our profession the best that is in them, and attained thereby a standard of high excellence. The marked interest in our County Association has never shown better purposes than at the present time. The reaching out after special opportunities for the higher duty has particularly characterized its membership, and the advancement made for the public good has been eminently commendable. Not along the line perhaps of brilliant research work has it been, but rather in carrying onward by practical application the suggestions of the advanced thinkers. Especially true is it in the work of public beneficence. The slumbering thought for a tuberculosis sanatorium in our county has had a glorious awakening. The earnest workers in our Association have fairly electrified the public mind, whose thought and energies have mingled with ours, to evolve a plan in which the hopeful beginning of a tuberculosis dispensary a few months ago in Bridgeport and more recently another in Norwalk will find a realization on the Tashua hills of Trumbull, overlooking the shores and waters of Long Island Sound.

Such a site has been selected for the sanatorium and the coming year we believe will "throw out the life line" to many a despondent case of tuberculosis, giving to the incipient patient the assurance of a healthful life restored, and to others less fortunate a safe refuge for their fading days.

The hospital work in our county still maintains its high standard. The extensive additions at the Bridgeport Hospital, and the erection now in progress of the new and better equipped hospital at Danbury, all show that the increasing demand for such benevolent care is being abundantly met by the ever generous response from the people of our county.

The good judgment of the Secretary, in selecting local Secretaries in all the towns in the county, a few years ago, has proved of great value in his work. These lines, running from the several towns to the home office, hold in close touch the

current medical news of the whole county. It would seem that a plan so valuable would not safely be discontinued.

The real activity of the medical life of Fairfield revealed itself at the last two meetings of our county; viz., the semi-annual at Danbury and the annual at Bridgeport. Much of the earnest scientific thought was present, which, brightened with sharp wit and humor, gave an impress of meetings of high character. Able men from medical centers outside the county and State brought to us their richest experience to entertain and to educate.

The annual visitation of the President of the State Society lent to our annual meeting much additional interest, and made us feel his fatherly care and supervision.

The new men that have been admitted to our Association have not greatly increased the roll of our membership. it is true, but we trust that these seven young men will prove themselves of much added worth and strength to our number.

The local Associations which have been organized in the smaller medical centers throughout the county, still exhibit a vigor that has proved of great stimulation to our County Association. The papers which find their way into these meetings are of high order, and greatly influence the professional work in our county.

The interchange of delegates among the County Associations in our State, again revived by us, will be, I believe, not only of pleasing interest but helpful withal.

The newly tested schedule of the semi-annual meetings of our State Society brings to our county this coming autumn its popular gathering. Fairfield delights in encouraging this desirable innovation on the part of the State Society, and assures a hearty welcome to our medical mother in her first visitation.

Only three members during the year have passed beyond the well-marked boundaries of their allotted days. The names of Clark, A. B. Gorham and Stanton will long remain with us as our able and untiring associates. The necrologist will write more fully of the influence of their life work in our profession,

but the true memorial will be their unwritten work, recorded in the hearts of those families into which they unstintedly poured their tender sympathy and their greatest skill.

Respectfully submitted,

GOULD A. SHELTON.

(e) Windham County, by Dr. Frank E. Guild:

Mr. President and Gentlemen of the House of Delegates:

It is my privilege once more to report for Windham County. The year has been a successful one for the County Association.

Two meetings were held; the fall one at Willimantic, which was well attended and interesting; the spring one at Putnam was, I think, without exception the best attended meeting since I have been a member of the Association, nearly twenty-two years. An especially gratifying feature of the meeting was that all of the papers read were given by members of the Association.

The same criticism can be made this, as was made last year, in regard to the absence of delegates from other County Associations. At the spring meeting only one outside county delegate was present. I believe that this neglect, on the part of those elected as delegates to other County Associations, to do their duty, is a great mistake.

If every county could be represented by one delegate at each of the other county meetings, there would be an interchange of sixty-four delegates during the year. This exchange would be of great benefit both to the visiting delegates and to the members of the County Associations visited, promoting as it would an acquaintance with the members of the different County Associations which does not exist to-day.

It is my painful duty to report the deaths of two of our most active members—Dr. T. M. Hills of Willimantic and Dr. LeClaire of Danielson. Both were men whose places it will be hard to fill and whose counsels will be greatly missed. We have lost one other member by removal—making a total

loss of three, which is balanced by the addition of three new members.

I think I may say without fear of contradiction that the Windham County Medical Association was never in a more healthful condition than at present, both as to numbers and as to good fellowship among its members.

Respectfully submitted,

FRANK E. GUILD.

(f) Litchfield County, by Dr. Edward H. Welch:

Mr. President and Gentlemen of the House of Delegates:

Although our Association now has only fifty-seven members, as compared with sixty members one year ago, there seems to be a general interest in the welfare of the Association, and the two meetings of the year have been well attended and interesting papers have been read by members and invited guests.

One former member left the State and has since died. Three other members removed to New York State, one of whom was given a transfer certificate to the Westchester County Medical Society. One member was given a transfer card to the New Haven County Medical Association. One member, retiring from active professional work, offered his resignation, which was not accepted, but it was voted to retain him as a member, but exempt from taxes, and to recommend that the State Society also exempt him from taxation.

Two members have been added by vote of the Association.

There is still a general opposition to contract work by nearly all of our members. None of our members have been expelled or suspended. There has been a pretty general response to the call for taxes, only four members at present being in arrears.

It has been proposed to change the time of the fall meeting from the second Tuesday in October to the first Tuesday in October, so that it will not conflict with the time of meeting of other County Associations.

Respectfully submitted,

E. H. WELCH.

(g) Middlesex County, by Dr. Frank K. Hallock:

Mr. President and Gentlemen of the House of Delegates:

The year has passed without special incident in the medical annals of Middlesex County. The two meetings of the County Association have been held with satisfactory results, both as to numbers in attendance and in the interest manifested in the scientific work.

The Central Medical Association of Middletown has had a most successful year. Many excellent papers have been presented and the discussions have been lively and profitable. An unusual number of speakers from outside the county have favored the Association with contributions.

The Middlesex Hospital, the general hospital of the county, continues to expand in efficiency of service, and it is most gratifying to note the splendid support given the institution by the people of the county. One gentleman of Middletown has recently provided funds sufficient to erect an isolation pavilion and another sum is being raised to enable the directors to make various other alterations and improvements.

The Medical Staff of the Connecticut Hospital for the Insane have taken, as usual, a prominent part in the medical life and affairs of the county. Without this corps of earnest and efficient men, our medical meetings could not make the showing they do nor maintain their present high level of excellence.

From a medical standpoint one of our weak points is in the lower or southern part of the county. Quite a number of young physicians have located here who possess ability, but who for some reason have not exhibited as much interest in the County Association as could be desired. It is hoped that their enthusiasm will soon be aroused.

A very limited amount of contract society work still exists, but a movement has recently been inaugurated which will ultimately do away with this kind of practice. My successor in office will, I trust, have a pleasant report to make on this subject when he meets you a year from now.

Respectfully submitted,

FRANK K. HALLOCK.

(h) Tolland County, by Dr. Thomas F. Rockwell:

Mr. President and Gentlemen of the House of Delegates:

As Councilor for the Tolland County Medical Association I have the honor to report that everything has been harmonious the past year, with no differences to adjust.

We have gained two new members, Dr. Wright B. Bean of South Norwalk and Dr. Francis M. Dickinson of Rockville, and have lost two by death. Two have moved from the county; Dr. Louis J. Mason has gone to Willimantic and Dr. E. O. Winship to New London.

We regret to report the loss to our Association by death of Dr. Alfred R. Goodrich of Vernon, one of the oldest and most respected practitioners in the State, and Dr. T. J. McCarthy of Rockville, a bright and promising young physician. Their obituaries were written by Dr. E. P. Flint and read by him at our annual meeting.

Our Association has had two well-attended and profitable meetings. The October meeting was held at Stafford Springs and the annual meeting at Rockville. The papers were unusually good and full of professional interest.

Respectfully submitted,

THOS. F. ROCKWELL.

(5) Report of the Treasurer, Dr. Joseph H. Townsend (New Haven), to the Connecticut State Medical Society, for the year ending May 26, 1909:

REPORT OF THE TREASURER.

RECEIPTS.

Balance from old account,	.	.	.	.	\$1,856.18
Cash from County Clerks:					
Hartford County,	.	.	.	\$472.50	
New Haven County,	.	.	.	677.70	
New London County,	.	.	.	148.50	
Fairfield County,	.	.	.	455.40	
Windham County,	.	.	.	99.90	
Litchfield County,	.	.	.	172.80	

Middlesex County,	\$108.00
Tolland County,	48.60

Total receipts from taxes,	\$2,183.40
	<u>\$4,039.58</u>

DISBURSEMENTS.

Dr. H. L. Swain, anniversary chr.,	\$ 98.60
Stenographers,	65.00
Yale Medical Journal for publishing Pro- ceedings,	2,250.00
Printing and stationery,	35.75
Postage, telephones, etc.,	16.80
Clerical work,	3.98
Dr. W. L. Higgins,	15.07
Salary of Secretary,	150.00
Salary of Treasurer,	25.00
Bond of Treasurer,	5.00
Expenses semi-annual meeting,	20.94

	<u>\$2,686.14</u>
Cash to balance,	1,353.44
	<u>\$4,039.58</u>

ARREARS IN TAX LAID MAY 28, 1908.

Hartford County,	\$117.00
New Haven County,	213.00
New London County,	none
Fairfield County,	33.00
Windham County,	12.00
Litchfield County,	12.00
Middlesex County,	none
Tolland County,	6.00

Total,	<u>\$393.00</u>
------------------	-----------------

Respectfully submitted,

JOSEPH H. TOWNSEND.

This is to certify that we have examined the accounts of the Treasurer, compared the expenditures with the vouchers and find the cash on hand as stated.

GOULD A. SHELTON,
C. S. RODMAN.

Hartford, Conn., May 26, 1909.

(6) Report of the Committee on Public Policy and Legislation, by Dr. Everett J. McKnight (Hartford):

REPORT OF THE COMMITTEE ON PUBLIC POLICY AND LEGISLATION.

Mr. President and Gentlemen of the House of Delegates:

A meeting of the Committee on Public Policy and Legislation for organization was held on October 9, 1908, at which Dr. E. J. McKnight was elected Chairman. Only one other meeting has been held during the year, but the Chairman can testify to the fact that a great deal of good personal work has been done by the members of the committee in their respective counties. At the latter meeting, which was held on February 25, 1909, the different matters before the General Assembly in which this Society was interested were carefully considered. The Chairman was given the power to secure the services of Dr. W. H. Smith, Superintendent of Bellevue and Allied Hospitals, at the hearing on the anti-vaccination bill and to pay his expenses. The optometry bill was discussed and it was voted that the bill as it stands be opposed by the committee. The advantages of having only one examining board were considered and a committee consisting of Drs. McKnight, Foote and Pratt was appointed to draw up resolutions to the State Society favoring one board. Matters pertaining to tuberculosis before the General Assembly have been so ably handled by Dr. Foster and his associates that it has not been necessary for this committee to more than give them their support.

House Bill 448, "An Act amending an Act concerning the sale of Poisons," carbolic acid being stricken out of the list, has been passed. House Bill 179, "Concerning the sale of

adulterated, misbranded food or drugs," has been passed by the House and is now tabled in the Senate. This amendment exempted from the provisions of the original bill, the tinctures and preparations of the United States Pharmacopœia and the National Formulary. House Bill 215, "An Act amending an Act concerning the sale of certain narcotic drugs," referring particularly to cocaine, has passed both the House and Senate. House Bill 453, "On the Practice of Medicine and Surgery," is now on the House calendar in the form of a substitute to the bill as introduced, changing the date at which certain requirements of the amendment of 1907 shall take effect from 1912 to 1914. House Bill 688, "An Act concerning the revocation of licenses of physicians," has been acted upon favorably by the committee but has not yet been reported. This gives the State Board of Health power to revoke the registration or license of any physician practising within the State upon proof satisfactory to said board that such certificate of registration or license was procured by fraud or false representation.

Only one anti-vaccination bill was introduced at this session. The anti-vaccinationists have never made so poor a showing at a committee hearing. The speakers opposed to the bill were Dr. E. J. McKnight, Dr. E. B. Hooker, Dr. W. H. Smith, Superintendent of Bellevue and Allied Hospitals, Dr. Richard Slee, Director of the Lederle Antitoxin Laboratories, Prof. Brewer and Mr. Hugh M. Alcorn.

Although not so ordered by the committee, your Chairman took the responsibility of paying the expenses of Dr. Slee, feeling sure that the Society would uphold him in this action.

The Committee on Public Health and Safety brought in an unanimous report against the bill, which was accepted and the bill rejected both in the House and Senate without objection.

"An Act concerning public health by defining optometry and regulating the practice thereof" is perhaps the most important matter which has come up for our consideration at this session and has not yet been reported out of committee. Upon first thought it would seem that to regulate the practice of fitting glasses and thereby ridding the State of many ignorant men

who prey upon the credulity of the people would be of advantage to the State. Upon very careful consideration of the matter, however, your committee felt that the passage of such a bill would be very dangerous to the State. It is true that similar bills have been passed in seventeen states in the Union, but it is easy to explain how this could be done when there was presented to the committee at the hearing the petition of several well-known practitioners in the State in favor of the bill. "What is everybody's business is nobody's business," and it would be a very easy matter to get such a bill passed in a state where no active opposition was organized.

The epileptic colony bill, which was continued from the last General Assembly, received a favorable report from the Committee on Humane Institutions and is now in the hands of the Appropriation Committee in the form of a substitute bill. Just what action will be taken up by them cannot be foretold, although we hope for a favorable report.

Too much praise cannot be given the members of the medical profession upon the Committee on Public Health and Safety, Dr. Albert W. Phillips of Derby, Dr. Gould A. Shelton of Shelton and Dr. James T. Sedgwick of Litchfield, for the excellent work done by them. Your Chairman wishes also to call attention to the very satisfactory services rendered by our attorney, Mr. Hugh M. Alcorn.

Respectfully submitted,

E. J. McKNIGHT.

(7) Report of the Committee on Medical Examinations and Medical Education, by Dr. C. A. Tuttle (New Haven):

REPORT OF THE COMMITTEE ON MEDICAL EXAMINATIONS AND MEDICAL EDUCATION.

Mr. President and Gentlemen of the House of Delegates:

Your Committee on Medical Examinations and Medical Education presents, with your permission, its sixteenth annual report. The work of the committee for the past year has been

carried forward consistently on nearly the same line as for the past few years, with such modifications only as ever-changing conditions demanded.

There have been held, as usual, three examinations, each extending throughout two days. Eighty-three candidates have been examined for certificates in general practice and sixty-four, or 77.2 per cent. have been found qualified. There have also been examined fifteen in midwifery, of whom ten have been granted certificates.

It has seemed advisable to ask for one change in the Medical Practice Act. Several medical colleges have not advanced their preliminary requirements as rapidly as the committee had hoped. Hence the change of date to January 12, 1914, has been agreed upon by the several boards as the time when it would be necessary for all colleges to meet the requirements of the law as modified.

The ever-present subject of inter-state indorsement has received exhaustive attention. At present, with the four-headed examination system which prevails in this State, it is impossible to make any satisfactory arrangements for the interchange of licentiate certificates; nor would the committee think it advisable to do so, on any omnibus plan, if it were possible. Our proximity to New York City, with the large transient Connecticut summer colony flocking here each year, renders the situation particularly complicated. The permanent medical population of this State is in excess of the average of the whole United States. Many physicians of our shore and mountain resorts rely in part upon the summer visitors to make it possible to maintain themselves and bring up and educate their families, and your committee is constantly receiving letters from such commending its attitude in this matter. However, that as little hardship as possible may be worked upon desirable applicants wishing to make Connecticut their permanent home, the committee is taking into account a candidate's credentials from other state boards, his preliminary education, his years of practice and the section in which he proposes to settle. We believe we are working out this matter to the

ultimate best for the whole profession in the State as well as for the commonwealth.

With this year expires the term of Dr. Barber upon the committee. His faithful and untiring service upon the committee can be fully realized only by those of us who have worked with him, and the members of the committee wish to express to the Council and the members of the Society their sincerest appreciation of his fellowship and his devotion to the work.

Respectfully submitted,

CHARLES A. TUTTLE.

Accompanying is a set of rules under which the committee is working; a set of questions used at the last examination, and a list of the successful candidates of the year, with their colleges and year of graduation.

RULES FOR EXAMINATION.

1. Examinations will be held on the second Tuesday of March, July and November, at the City Hall, New Haven, beginning at 9.30 A. M., and lasting two days, closing at 4.30 P. M. of the second day.

2. Examinations will be conducted in writing in the English language.

3. Examinations for general practice consist of ten questions in each of the following branches: 1 Anatomy. 2 Physiology. 3 Medical Chemistry and hygiene. 4 Materia Medica, including therapeutics. 5 Practice, including pathology and diagnosis. 6 Obstetrics, including gynæcology. 7 Surgery.

4. In order to obtain a certificate of qualification the applicant must obtain a general average of 75 per cent. In no branch shall his percentage be less than 60, and in Practice, Obstetrics and Surgery the minimum requirement will be 65 per cent.

5. Examination fee, \$15.00, payable in advance on the first day of examination. Candidates once rejected may be reexam-

ined at any subsequent meeting of the Board but must pay full fee for each trial.

6. All candidates must be graduates of some reputable Medical College and must present their diplomas (or a certificate from the Dean of the Medical College) for inspection, to the Secretary of the Board at the opening of the session. As evidence of the required preliminary education, he must also present a diploma from an accepted high or preparatory school or documentary proof that this preliminary education is equivalent thereto. From and after January 12, 1914, no person can be admitted to the examinations until, in addition to the foregoing, he shall present evidence of his having completed a satisfactory course of study of at least nine months in Chemistry, Physics and General Biology.

7. Each candidate must present his photograph as a means of identification. This will be retained and kept on file by the Secretary.

8. Formal application (blank enclosed) must be made to the Secretary at least five days before the date of the examination. This must be accompanied by a certificate of good moral character signed by two reputable citizens of this state.

9. Questions used at some former examinations will be found in the yearly Proceedings of the Connecticut Medical Society—the Board is unable to supply copies.

10. A license or an examination in another state is not accepted by this Board. All candidates must undergo the regular examination. It is unlawful to practice in this state before examination and license. No temporary or provisional certificate can be given.

DIGESTS OF THE LAWS OF 1907.

a. No person shall, for compensation, gain or reward, received or expected, treat, operate or prescribe, for any injury, deformity, ailment or disease, actual or imaginary, of another person, nor practice surgery or midwifery, until he has obtained a certificate of registration, and then only in the kind or branch of practice stated in said certificate.

b. No person shall obtain a certificate of registration until he has passed a satisfactory examination before one of the examining boards appointed for the purpose, nor until he has filed duplicate certificates signed by a majority of said examining board, stating that they have found him qualified to practice either medicine, surgery or midwifery, nor until he has filed duplicate statements subscribed and sworn to by him upon blanks furnished, giving his name, age, place of birth and present residence, stating of what medical college he is a graduate, and the date of said graduation, together with such other information as shall be required. No person shall be eligible to said examination until he presents to the board, by whom he shall be examined, satisfactory evidence that he has received a diploma from some legally incorporated and reputable medical college and complied with the requirements of the law concerning preliminary education. Any person passing such an examination and filing said certificates and statement shall receive from the State Board of Health, upon payment of two dollars, a certificate of registration, which shall state that the person named has been found qualified so to practice. He shall be registered in the town wherein he resides or the town nearest thereto—but shall be entitled to practice anywhere in this State without further registration.

RULES FOR CONDUCTING EXAMINATIONS.

First, Help of every kind must be removed from the reach and sight of the candidate. Any candidate detected trying to give or obtain aid may be instantly dismissed from the room, and his or her paper for the entire work canceled.

Second, Questions must be given out and answers collected punctually at the time specified for that section.

Third, If the candidate withdraws himself or herself without permission from the sight of the examiner, his or her examination shall be closed.

Fourth, All examinations shall be in writing. Pens, blotters, paper or blank books and ink will be supplied by the Secretary.

Fifth, The examination shall continue two days, the sessions

of the first day being from nine-thirty to eleven, eleven to one, two to four, four to six, respectively; the sessions of the second day being the same, but closing at four-thirty instead of six o'clock.

EXAMINATIONS IN MIDWIFERY.

1. Examinations in Midwifery will be held at the same time and place as for General Practice, and under the same rules and requirements.
2. Applicants to practice Midwifery will be examined in Midwifery only and must obtain a marking of 75 per cent.
3. Examinations will be in writing; but may be taken in the language of the applicant, the applicant to furnish and pay an interpreter acceptable to the Board.
4. The examination fee will be \$10.00 and is payable at the time of taking the examination.
5. All applicants must be graduates of some reputable college or school of Midwifery and must present her diploma for inspection at the opening of the session. A photograph is also required.

EXAMINATION QUESTIONS, MARCH 9-10, 1909.

SURGERY.

(Two hours.)

1. Describe a typical case of surgical shock, giving an explanation of the symptoms.
2. What are the indications for surgical interference in acquired torticollis?
3. Describe in detail your method of operation for torticollis.
4. (a) What variety of malignant growth is most frequently found in the female breast? (b) Describe the salient features of a section of the tumor as seen under the microscope.
5. Describe the radical operation you would perform for malignant growth described in question 4.
6. Give the signs and symptoms of fracture of the shaft of the femur.

7. Name the varieties of dislocation of the hip joint and give the signs by which you would differentiate them.
8. Give the diagnosis and treatment of bilateral dislocation of the lower jaw.
9. Describe an operation for the radical cure of an oblique inguinal hernia.
10. Give the diagnosis and treatment of acute prostatitis.

CHEMISTRY AND HYGIENE.

(One and one-half hours.)

1. Give the characteristic symptoms and the treatment of strychnine poisoning.
2. Name the constituents of: (a) Normal urine; (b) Cystitic urine.
3. Lead poisoning: what are (a) the common causes; (b) the symptoms; (c) the treatment?
4. (a) What is urea? (b) Where does it originate in the body? (c) How is it excreted?
5. What is the composition of sewer gas? How does it differ from sewer air?
6. What are the most important pigments of the human body? Describe any two.
7. (a) What do you understand by immunity? (b) Define acquired immunity. (c) Define natural immunity. (d) Give an example of each.
8. What is a salt? Give chemical name and formula of: (a) Glauber's; (b) Rochelle; (c) Epsom; (d) Lemon; (e) common.
9. What is the chemical name of H_2S ? (b) Where and how does it form in the body? (c) How does it act as a poison?
10. State (a) the reaction; (b) the specific gravity; (c) the composition; of cow's milk. (d) How does it differ from woman's milk? (e) Explain chemically how milk sours.

ANATOMY.

(Two hours.)

1. Give: (a) the composition of bone; (b) its gross and its microscopical structure.

2. Describe the clavicle and its articulations.
 3. Describe the hip joint and its ligaments.
 4. Give: (a) the gross anatomy of the lungs; (b) the minute anatomy of a lobule of lung tissue. (c) What vessels furnish nutritional and what vessels the functional supply of blood to the lungs? (Diagram.)
 5. (a) Bound the axilla. (b) Name and give relations of the structures contained. (c) What is their surgical importance?
 6. Describe the heart: its cavities; the vessels leading into it and out of it; its nutritional blood supply; its nerve supply.
 7. Describe (a) the pancreas, and (b) the important structure that passes through its head.
 8. Describe the "portal circulation," with diagram.
 9. What abdominal viscera are invested by the lesser peritoneal sac?
 10. Where are the motor centers of the cerebrum located? How is their location delineated upon the surface of the scalp?
- N.B. Make diagram wherever useful.

PHYSIOLOGY.

(One and one-half hours.)

1. Describe the principal functions of the digestive juices.
2. Discuss the factors concerned in venous circulation. What relation has this to œdema, anasarca, or dropsy?
3. Name and define the special senses, particularly describing visual accommodation and each factor involved.
4. Explain the endogenous (internal) and the exogenous sources of uric acid.
5. Trace the course of a motor nerve through brain and cord.
6. Tell what you know of the chemistry of respiration.
7. Diagram and describe the direction of degeneration on section of the anterior and the posterior root, respectively, of a spinal nerve.
8. State in detail how the placenta performs its functions.
9. Describe briefly and clearly how digested food is absorbed.
10. Define: (a) colostrum; (b) lochia; (c) emmetropia; (d) autolysis; (e) diapedesis; (f) hemolysin; (g) osmosis; (h) alexins; (i) atavism; (j) zymogen.

MATERIA MEDICA AND THERAPEUTICS.

(Two hours.)

1. What is the physiological action of mercury and its salts? In what ways can it be administered?

2. Describe briefly how antitoxin is produced.

3. Give the composition of compound cathartic pill. What is the action of each ingredient?

4. Contrast the action of strychnia and physostigma.

5. Give the physiological action and therapeutic uses of phenacetin.

6. What is the treatment of eczema in children?

7. Give the action and therapeutic uses of creosote.

8. Name four diaphoretics and state how they act.

9. Give the general management and treatment of a case of scarlet fever.

10. Give the technique of vaccination. What is vaccinia? Describe its normal course.

OBSTETRICS AND GYNÆCOLOGY.

(Two hours.)

1. Differentiate sapræmia from septicæmia. Give the prognosis and treatment of each.

2. Describe menstruation. Give relations between ovulation and menstruation.

3. Give the symptoms of pelvic hæmatocele. What is the principal cause? Give treatment.

4. State: (a) the clinical history; (b) the diagnosis; (c) the treatment; of hydatidiform mole.

5. Give: (a) causes; (b) classes; (c) treatment; of fibroid tumor of the uterus.

6. Discuss the theory of the migration of the ovum.

7. Mention: (a) probable signs of pregnancy; (b) positive signs of pregnancy; (c) signs of a previous pregnancy.

8. (a) What is the toxæmia of pregnancy? (b) What organs show the lesion? (c) Give the theory of belief as to the cause of the condition.

9. When is manual removal of the placenta necessary? Give technique. What are the dangers?

10. What is your procedure when you find the cord prolapsed into the vagina, the cervix two-thirds dilated and regularly dilating?

PRACTICE, PATHOLOGY AND DIAGNOSIS.

(Two and one-half hours.)

1. Describe a case of hypertrophic cirrhosis of the liver, giving: (a) etiology; (b) symptoms; (c) pathology; and (d) diagnosis.

2. Give the causes and the pathology of hypertrophy of the heart.

3. Differentiate pernicious anæmia and myxœdema.

4. What is leucocytosis? In what common diseases does it occur? In which is it absent?

5. Give the symptoms and treatment of bronchial pneumonia in infants.

6. Give the causes of œdema and state how they act.

7. Describe a case of acute nephritis. Give the pathology.

8. Give the symptoms and treatment of cerebro-spinal meningitis.

9. Differentiate cerebral hæmorrhage and embolism.

10. Describe a case of herpes zoster.

QUALIFIED IN MARCH, 1908.

Altshul, Henry, P. & S., Columbia, 1887.

Dickensen, F. M., P. & S., Columbia, 1905.

Doroff, Louis A., Yale, 1905.

Egan, John J., Univ. Md., 1897.

Hendricks, A. L., Yale, 1907.

Johnston, Ernest H., Univ. Md., 1900.

Marigini, Gerard, Naples, 1907.

Purney, John, Balt. Med., 1906.

Rowley, John C., Harvard, 1906.

Smith, Gilbert T., Univ. Md., 1897.

IN JULY.

- Avitabile, A. L., Yale, 1908.
Bartlett, W. B., Harvard, 1905.
Belisle, A. E., Jeff., 1908.
Bernsten, A., Yale, 1908.
Boyle, R. J., Yale, 1908.
Brown, L. R., Tufts, 1907.
Cassidy, L. T., Georgetown, 1908.
Clarke, R. DeB., Johns Hop., 1908.
Day, H. F., Harvard, 1905.
Dow, E. L., P. & S., N. Y., 1895.
Downing, F., Balt. Med., 1908.
Dwyer, R. J., Jeff., 1908.
Dunn, F. M., Balt. Med., 1908.
Foupp, G. D., McGill, 1906.
Grant, A. S., N. Y. Univ. and Bell., 1908.
Grasso, A., P. & S., Boston, 1908.
Hershman, A. A., Yale, 1908.
Hine, R. K., Md. Med., 1908.
Keating, H. F., Yale, 1908.
Kiernan, J. M., N. Y. Univ., 1908.
Linde, J. I., Yale, 1908.
McGrath, J. H., Yale, 1908.
O'Brien, J. T., Yale, 1908.
O'Donnell, T. J., Syracuse, 1908.
Parlato, M. A., Yale, 1908.
Perreault, J. N., Tufts, 1907.
Pond, L. B., Harvard, 1906.
Scarbrough, R. McR., Yale, 1897.
Schuele, G. J., Yale, 1908.
Sheehan, J. E., Yale, 1908.
Simonson, L., Tufts, 1908.
Smith, G. A., Johns Hop., 1907.
Teehan, G. E., Yale, 1907.
Volkenheim, M., Yale, 1908.
Walsh, J. W., P. & S., Balt., 1907.
Whalen, E. J., Yale, 1908.
Zeman, B., Kentucky Sch. Med., 1908.

IN NOVEMBER.

- Agnew, R. R., Harvard, 1908.
 Black, J. E., Yale, 1908.
 Burbank, H. E., N. Y. Univ. and Bell., 1907.
 Deming, E. A., Johns Hop., 1908.
 Godfrey, W. T., Cornell, 1907.
 Grandmaison, A. J., Tufts, 1908.
 Hart, B. I., P. & S., Columbia, 1908.
 Hogan, F. J., Harvard, 1908.
 Markolf, H. T., Harvard, 1908.
 McQueeney, M. A., Yale, 1905.
 McSweeney, Univ. Vt., 1891.
 Merrill, C. H., Harvard, 1908.
 Seabrook, J. M., Howard, 1908.
 Sullivan, J. B., Yale, 1906.
 Tracy, D. W., Johns Hop., 1908.
 Woodford, C. N., Univ. Louisville, 1908.
 Zink, C. E., Balt. Univ., 1900.

(8) Report of the Committee on Scientific Work, by Dr. Oliver C. Smith (Hartford):

REPORT OF THE COMMITTEE ON SCIENTIFIC WORK.

Mr. President and Gentlemen of the House of Delegates:

Your committee wishes to express its sincere appreciation of the spirit and courtesy which the members who have been invited to read papers and open discussions have manifested. For this reason the work of the committee has been an agreeable task.

Six meetings have been held, at which the committee have endeavored to leave nothing undone to insure the success of the scientific part of our coming meeting. The plan of grouping the papers on special subjects, which has been adopted for the past three years, has been received so favorably that your committee has followed this arrangement in the

present programme. As heretofore, the authors' names are arranged alphabetically, thus determining the order in which the papers are read. The names of those who open the discussions are arranged in reversed order of seniority. The authors have been consulted with regard to those who are to discuss the papers. It has been our endeavor to select those of special fitness, at the same time making a fair distribution throughout the State. The Secretary of the Association has accompanied each invitation to read a paper by a request that a copy of the MSS. be placed in his hands one week before the annual meeting, and also that a copy be sent at the same time to each of those who are to discuss the paper. With the present quick and inexpensive methods of producing copies of typewritten papers the authors should be willing to comply with this request, as in this way the discussions will be more surely and easily prepared and more to the point. We trust that this will become a common usage and that succeeding committees will insist upon its practice.

Following the example of the Committee on Scientific Work for 1908, your committee deem it proper and desirable to present in this report the programme for the one hundred and seventeenth annual meeting of the Connecticut State Medical Society, held at the Hunt Memorial Building, 38 Prospect Street, Hartford, May 26 and 27, 1909.

PROGRAMME.

WEDNESDAY AFTERNOON, MAY 26, 2 P. M.

Bacterial Vaccines in the Treatment of Disease—Charles J. Bartlett, New Haven. (Discussion opened by George Blumer, New Haven.)

Phlebotomy in Dermatology—Thomas M. Bull, Naugatuck. (Discussion opened by Mark S. Bradley, Hartford, and Ralph A. McDonnell, New Haven.)

Localization of Lesions of the Genito-Urinary Tract—Frank H. Coops, Bridgeport. (Discussion opened by Percy D. Littlejohn, New Haven, and Charles S. Stern, Hartford.)

Ocular Manifestations of Systematic Diseases—Michael H. Gill, Hartford. (Discussion opened by Edward M. McCabe, New Haven, and Arthur N. Alling, New Haven.)

Partial Responsibility of the Insane—Frederick T. Simpson, Hartford. (Discussion opened by Allen R. Diefendorf, New Haven; Whitefield N. Thompson, Hartford, and James M. Keniston, Middletown.)

THURSDAY MORNING, MAY 27, 9.30 A. M.

Hæmolysis—Harold Sears Arnold, New Haven. (Discussion opened by Charles J. Bartlett, New Haven, and George Blumer, New Haven.)

The Influence of the Thoughts and Emotions in the Causation of Disease—Samuel D. Gilbert, New Haven. (Discussion opened by John L. Buel, Litchfield; Charles J. Foote, New Haven, and Frank K. Hallock, Cromwell.)

Disposal of Sewage in Rural Districts—Frank E. Guild, Windham. (Discussion opened by Joseph H. Townsend, New Haven; Edward K. Root, Hartford, and John P. C. Foster, New Haven.)

Appendicitis During Pregnancy—Otto G. Ramsay, New Haven. (Discussion opened by William F. Verdi, New Haven, and Everett J. McKnight, Hartford.)

THURSDAY AFTERNOON, MAY 27, 2.30 P. M.

Ectopic Gestation—Phineas H. Ingalls, Hartford. (Discussion opened by Henry G. Anderson, Waterbury, and Samuel M. Garlick, Bridgeport.)

The Importance of More Thorough Surgical Diagnosis and the Aid Afforded by Various Differential Tests—Harris F. Brownlee, Danbury. (Discussion opened by Ernest A. Wells, Hartford; John B. Boucher, Hartford, and Leonard W. Bacon, New Haven.)

Heredity in Crime, a Study in Eugenics—William H. Carmalt, New Haven. (Discussion opened by Albert Garvin, Wethersfield; George H. Knight, Lakeville, and Charles C. Beach, Hartford.)

A Study of the Effect of Removing Large Portions of the Small Intestine—Joseph M. Flint, New Haven. (Discussion opened by Yandell Henderson, New Haven, and Lafayette B. Mendel, New Haven.)

Some Practical Points in the Administration of Anesthesia—Richard F. Rand, New Haven. (Discussion opened by John E. Lane, New Haven, and Orin R. Witter, Hartford.)

It will be seen that a wide range of subjects, both practical and scientific, are included in this programme, and it is hoped that it will prove of unusual interest.

The Chairman wishes to acknowledge his deep appreciation of the able assistance of the members of the committee, Dr. Rush W. Kimball and Dr. Walter R. Steiner, Secretary of the Connecticut State Medical Society, member *ex officio*, the latter having had the work constantly in mind since the organization of our committee.

Respectfully submitted,

OLIVER C. SMITH.

(9) Report of the Committee on Honorary Members and Degrees, by Dr. William G. Daggett (New Haven). Read by the Secretary in the absence of Dr. Daggett:

REPORT OF THE COMMITTEE ON HONORARY MEMBERS AND DEGREES.

Mr. President and Gentlemen of the House of Delegates:

The Committee on Honorary Members and Degrees beg leave to report that they have no business to bring forward, no names having been referred to them for honorary membership or degree.

Respectfully submitted,

WILLIAM G. DAGGETT.

(10) Report of the Committee on Arrangements, by Dr. Frederick S. Crossfield (Hartford):

REPORT OF THE COMMITTEE ON ARRANGEMENTS.

Dr. Crossfield, as Chairman of this committee, spoke of the plans for the Society's entertainment. On Wednesday evening, May 26, at 8.30 P. M., the Hartford Medical Society invited the members of the State Society and their guests to a smoker, at the Hunt Memorial Building, 38 Prospect Street. On the following evening the annual banquet was to be held at 8 o'clock, at the Allyn House. The price of the dinner would be \$2.50 a person.

(11) Report of the Committee on Venereal Diseases, by Dr. R. A. McDonald (New Haven):

REPORT OF THE COMMITTEE ON PREVENTION OF VENEREAL DISEASES.

Mr. President and Gentlemen of the House of Delegates:

Your committee would respectfully report that in the opinion of its members there is, at present, no feasible means of controlling the spread of venereal diseases which is not already in use.

In New England, especially, there is a strong sentiment against any legislative control, because that would, in a sense, be legalizing prostitution.

While we, as a committee, firmly believe that measures for the control of this traffic should be taken by the State, we cannot hope, for many years to come, to so change public opinion as to bring these measures to pass.

For the present, our efforts must be directed to the education of the people in the knowledge of the gravity of the danger, and we take some satisfaction in the apparent progress which is being made in this direction. A notable lecture was recently delivered on the subject before the New Haven Mothers' Club, which gave many of the audience something to think about which has made them uneasy ever since. In Yale University every student is obliged to listen to several lectures upon sexual

subjects, and a notable change is taking place in the attitude of the student body toward the dangers of venereal disease. One of your committee was recently interviewed by an editor of a popular magazine, who proposes shortly to publish a series of articles dealing very plainly with the subject, and we believe that such articles, if carefully written, will do an immense amount of good.

In presenting this final report, we wish to express the opinion that many members of our Society are remiss, inasmuch as they shirk their very evident duty, repeatedly pointed out by this committee, of personal instruction on sexual matters to parents and children who come under their care.

Respectfully submitted,

R. A. McDONNELL,
JAY W. SEAVER,
FRANK H. WHEELER.

(12) Report of the Committee on a Colony for Epileptics in Connecticut, by Dr. Max Mailhouse (New Haven). Read by Dr. Edwin A. Down in the absence of Dr. Mailhouse :

REPORT OF THE COMMITTEE ON A COLONY FOR EPILEPTICS IN CONNECTICUT.

Mr. President and Gentlemen of the House of Delegates:

Your committee, having in charge the matter of seeking legislation directed to the establishment of a colony for epileptics, has to report a continuation of its efforts in that direction. Governor Lilley, in his inaugural address this year, called the attention of the General Assembly to this subject. Hearings have already been held by the committees on Humane Institutions and on Appropriations. A bill, asking for an appropriation of \$25,000 for the establishment of a colony, has been recommended by the former committee and is now being considered by the latter. The measure has been ably handled at the Capitol by your Committee on Public Policy and Legislation, aided by the presence and remarks of laymen and physi-

cians, and we fondly hope that the Appropriations Committee will, this time, be convinced of the necessity and advisability of passing favorably upon the measure.

Respectfully submitted,

MAX MAILHOUSE.

(13) Report of the Delegates to the American Medical Association, read by Dr. D. Chester Brown:

REPORT OF THE DELEGATES TO THE AMERICAN
MEDICAL ASSOCIATION IN 1908.

Mr. President and Gentlemen of the House of Delegates:

There were some things about the fifty-ninth annual session of the American Medical Association held at Chicago last year that made it a noteworthy meeting. The first thing that impressed the attendant at this convention was that it was a big one; that even Chicago was overtaxed, both in hotel accommodation and in meeting places. When at the close of the session it was found that 6,446 had been registered, it was evident to all that a new problem awaited solution for the Association, and that if growth and attendance increased as they had been doing, the question of accommodations would in the near future be a very serious one. The registration at Atlantic City one year before had been 3,713. At Boston two years previous, 4,722. Of course, Illinois had taken pride in getting out a full attendance, but Indiana, Iowa, Michigan, Minnesota, Ohio, Pennsylvania and Wisconsin outranked any Eastern state, even including New York, in attendance. This distribution of the registration shows the importance of holding the conventions in the various sections of the country, in the stimulus to attendance, but how such large gatherings are to be accommodated would seem to be an insurmountable problem and in the near future may result in dividing the association up into sections.

While the address of the President of the American Medical Association to the House of Delegates, as well as the proceed-

ings of the house in detail, have been published in the *Journal* of the Association, there are certain features in both that are worthy of emphasis in the report of your delegates.

In presiding over the meeting of the House in the fifty-ninth session of the Association, President Joseph D. Bryant had none of the stormy passages among the peppery members that marked some of the sessions at Atlantic City the year before, when his excellent knowledge of parliamentary principles, quick grasping of the situation and instantaneous decision on disputed points, marked him as a presiding officer of the first rank. This placidity in the proceedings of the House was not all due to the amiability permeating its members on their arrival in the "Windy City," but was one of the happy results of the working rules of the House, adopted at this session for the first time; namely, immediately after a committee report, or measure of new business was read, it was assigned to the proper reference committee without any preliminary discussion. The matter would then come back to the House with the endorsement or rejection of the committee, and their reasons could be given in a dispassionate, unbiased manner. It was certainly astonishing to observe how this simple means removed so much acrimony and heated discussion from the floor of the House and saved so much time for the members. It is true that this method of proceeding tends to centralize influences in these reference committees and thus give the impression of clique rule, but these committees are appointed annually by the President, and the President is elected by the House of Delegates and cannot be selected from one of their membership. So that the appointing power is constantly coming back to men taken from the Association at large, and they are men of mark, not easily led by any clique.

For many years it has been advocated by the medical profession that there should be a concentration of the bureaus concerned directly or indirectly with hygiene, sanitation and public health, which at present are scattered through the various departments of the government at Washington, and the establishment of a Department of Public Health. Advo-

cated strongly in the American Medical Association, this finally appealed to other scientific organizations, and now has their endorsement and support. It came up to the last House of Delegates in two forms. The first that the A. M. A. ask Congress to establish a Department of Public Health, with its secretary a Cabinet officer, while the other endorsed the conduct of the Public Health and Marine Hospital Service in its successful efforts to protect this country from the invasion by plague and yellow fever, and that the powers of this service be so enlarged that they act as a bureau of public health. The whole matter was referred to the Committee on Legislation and Public Action, to which hearing a general invitation was given to the members of the House who might be interested in the matter. It was possible for one of us to attend this hearing and with Surgeon H. C. Beyer representing the Navy and Surgeon M. W. Ireland the Army, and both on this particular committee, it became immensely interesting when the statement was made before the committee that Surgeon General Wyman was quietly and persistently exerting his influence to prevent the consolidation of the various bureaus or the establishment of a Department of Public Health. At this hearing it was stated that President Roosevelt was unalterably opposed to the Cabinet being enlarged; that this did not mean that there was no member of the medical profession who would be acceptable for such a position, but that the official family was already so large that it was unwieldy; and this has also come to us from other and reliable sources, as the position that President Cleveland took and it has more recently been stated by President Taft. Here then has been the deadlock that has prevented the country from enjoying the benefits that it is believed would result from a national control of many situations involving hygiene and contagious diseases. The A. M. A. insists stubbornly upon the necessity of a Department of Public Health and that the medical profession is entitled to recognition in this by having one of its members selected to occupy the seat in the Cabinet that the establishment of such a department would carry with it, while the chief executives are opposed to

the enlargement of the Cabinet, and the Surgeon General is more or less secretly and successfully maintaining that the bureaus already existing need but enlarging of their powers to be adequate to cope with the conditions.

The stormy session of this committee finally resulted in a recommendation to the House that was adopted; namely, that the Committee on Legislation arrange for conferences with the committee of the Association for the Advancement of Science, the Surgeon General and others interested in the matter and attempt such coöperation as will further the creation of such a department.

To bring the matter up to the present date it may be stated on what appears to be good authority, that the establishment of a department carrying the appointment of a Cabinet officer seems inadvisable; that this is the time to make a beginning by obtaining a consolidated bureau, probably in the Treasury Department, with enlarged powers and scope of action, and thus demonstrate the importance of the work, and then later, if it should be wise and necessary, a department would be the outgrowth.

The personal application of all this is, that every medical man should take this into serious consideration and have clear ideas on the subject, for in a matter of health that is of national scope in importance the medical profession is looked to as authority. Whether our individual sphere of influence reaches direct to a national legislator or not, every member should exert his personal influence in moulding public sentiment and opinion correctly.

One of the reasons of choosing Chicago for the meeting place of the Association for the last session was that the members of the Association, and especially the House of Delegates, as the body upon which the responsibility rested, should have an opportunity to personally investigate the conditions of the property that the Association was accumulating there and the conduct of its chief enterprise, the *Journal* of the Association. The members of the House very generally accepted this added responsibility laid upon them, and visited the property and

more or less intelligently and thoroughly inspected the facilities for conducting the vast affairs of the *Journal*. The building in which the *Journal* is housed is a good substantial structure, well adapted for its purpose. The machinery is, most of it, up to date and meets the requirements, while the quality of the product is brought to each one of you each week for your individual judgment to be passed upon it. While the character of the work in the *Journal*, its contributions, its editorial work and its general conduct has produced one of the finest medical journals in the world, yet the character of its chief editor has not escaped criticism, and because these criticisms have not been brought up for official action, but have yet been made widely to the individual members of the Association, it seems but right to your delegates that some mention of them should be made in their report. In brief, they are these: the editor and Secretary was first graduated as a homeopath. While in practice as such, he advertised. It is stated further that he obtained a diploma from Rush Medical without doing the requisite amount of work and by misrepresentation.

The A. M. A. states in its By-Laws that membership in the Association is open to those members of a constituent association who are in good and regular standing, and to-day membership in the constituent associations is offered to any reputable practitioner, of whatever school a graduate, provided he does not practise sectarian medicine. Dr. Simmons had been in practice a number of years when he wanted to obtain a regular diploma with the least loss of time to himself that he could. He met the requirements made of him at that time by that college. It is no more fair to condemn the college by the standards of to-day than it is to condemn the man for advertising at that period in the development of ethics at that particular place, by comparing such an act with the present standard and with other locations.

There has not been one word said in all the attack that has come to our notice, that reflects upon the professional standing of the editor of the *Journal* since his reception into the

A. M. A. It is therefore our opinion, on investigation, that an attack of this character, made in this manner, should in no way impair the usefulness of the present editor in his work, and that the Association at large owes him much for the present high standard of medical ethics.

In the report of the Committee on Medical Legislation made two years ago at Atlantic City, after reciting that for two years attempts had been made to obtain executive appointment of a medical man on the Panama Canal Commission, and that it was discovered that the whole sanitary service was subordinated in the seventh degree below the appointive power; that the agitation was continued for two years, with the result that Colonel Dr. Corgas was appointed a full member of the Commission in special charge of sanitation. How well he fulfilled his obligations, how much he did for the country in demonstrating the possibilities of sanitary science in making certain great undertakings practicable, is a matter of history with which you are all familiar, and of which we all, as a profession, are proud. It is not surprising that when his name was proposed for the Presidency of the American Medical Association, that that nomination made the casting of votes a mere matter of form. When he takes his office as President at the first general session at Atlantic City, it will be well worth while for every member who can be there to hear his address at first hand rather than read it as reported.

During the two years that I have been one of the representatives of the Connecticut Medical Association in the House of Delegates of the A. M. A., I have studied more or less diligently to familiarize myself with the conditions that the duties of a delegate made it obligatory for me to know. It took but a short time for me to discover that the position of Delegate to a National Association had been too easily bestowed, too lightly received. The only redeeming feature I could see in the selection of the Society was that the Delegate chosen was willing to work and knew the need of it. The selection of a member as a Delegate is an honor to him and should be the means of a distinguished recognition of the State from which the member

comes. For the honor I am deeply grateful. For distinguished service for the State I can only regret the failure. If in making the report to this honorable body I can draw attention to the particular qualifications that it has appeared to me your representative should have, I should feel that the time and study given the conditions had not been in vain.

If it requires a year or more for the Delegate to become familiar with the methods of the House, it may be said that it requires more than that time for the House to become familiar with the Delegate, to give him prestige and standing in the House. While the Constitution requires that a Delegate shall be elected for two years, it becomes the part of wisdom for a State having only small representation in the House to make that as efficient as possible, and this can only be done by reëlecting them for longer terms than the two years prescribed. Therefore, having chosen wisely in selecting your Delegate, I would urge upon you the wisdom of reëlecting him for one or more terms. Those States that have adopted this policy have had the most influence in the House. It is true that these men become marked; that their continued service upon committees year after year, their familiarity with the work and their constant activity in it give rise to the feeling that there is clique rule. The ring is open, however. It is for you to send men with the address to enter it, and having obtained the *entrée* this honorable House can well afford to accord such interest in the doings of the national House as to take the time for hearing and consideration of their reports from *each* of the Delegates. These reports would tend to familiarize our membership with the detail work of the national body and would tend to stimulate interest in it and fit a greater number for taking up the responsibilities of the work.

If we can select men for our representatives who enjoy legislative work, good parliamentarians, clear in their views, patient and studious in familiarizing themselves with the work to be considered, we shall have men who will vote correctly, though not necessarily have large influence. If we can add to these qualifications, men who also are pleasing in address, fluent

in speech on the floor of the House, good debaters, yet not contentious, in such proportion as we can present these qualities in our Delegates, in such proportion will we do our duty to our Society and render service to the National Association.

My colleague will have to pardon me for making direct reference to him, but I would not feel that I had been true to my purpose of serving the Society honestly if I did not take the opportunity of stating that in him you have selected one of our two, wisely. It yet remains to select the second, and when that is done let us keep them there and demonstrate that Connecticut's representation, though small, is and must always be of the first order.

(14) Report of the Member of the National Legislative Council, by Dr. Everett J. McKnight (Hartford) :

REPORT OF THE MEMBER OF THE NATIONAL LEGISLATIVE COUNCIL.

Mr. President and Gentlemen of the House of Delegates:

Report of Delegate to the annual conference of the Committee on Medical Legislation and the National Legislative Council of the American Medical Association at Washington, D. C., January 18, 19 and 20, 1909 :

An interesting and it is to be hoped profitable meeting of the conference was held in Washington on January 18, 19 and 20 of this year. The various matters now pending in Congress affecting the medical profession and public health were carefully considered, necessary amendments discussed and the recommendations of the Council referred to the Committee on Legislation. The several matters under discussion were the public health bill, "further to protect the public health and imposing additional duties upon the Public Health and Marine Hospital Service"; the navy medical reorganization bills, calling for the organization of a naval medical reserve corps similar to that established in the army, the establishment of a corps of female nurses in the navy, the establishment of a corps of dental surgeons for the navy, a bill providing for the reorganization of the Hospital Corps and the regulation of its

pay, and the placing in commission of a hospital ship for the navy. The question of uniform state laws as regards the regulation of medical practice, the reporting of vital statistics, pure food laws and expert medical testimony, was taken up and discussed at length. The report of the committee on the optometry bills which have passed the legislatures of several states and are now pending in others, was as follows:

WHEREAS, a class of opticians whose proper function consists in making and adjusting glasses as directed by an oculist, is actively seeking legislation in several states under the name of "Optometry," legislation which will in effect give them the sanction of the State to examine eyes and to prescribe for the same; and

WHEREAS, the qualifications usually required in these petitions for such legislation are entirely inadequate to justify the State in conferring such important privileges upon any class of people; and

WHEREAS, the bills presented to the various legislatures for enactment will not prevent the so-called "Optometrist" from practising ophthalmology, one of the most important branches of our professional work; and

WHEREAS, such action on the part of the State will tend to elevate a trade, devoid of the essential qualifications, to the dignity and importance of a profession in the minds of the public; and

WHEREAS, the result of such license will doubtless be to establish a class of uneducated and poorly qualified oculists, who will occupy practically the same legal position in the community as is now occupied by the most accomplished physicians;

Now, therefore be it resolved, that in the opinion of the Committee on Medical Legislation, and of the National Legislative Council of the American Medical Association in Conference assembled, the granting of such a license to opticians will do great harm to the public by reason of the fact that it gives to persons, who are ignorant of the fundamental principles of diagnosis, ignorant of the profound relation that may exist between ocular fatigue and serious neurological disturbances, as well as of the many deep-seated, intra-ocular affections of the eye, the sanction of the State in their attempts to do the work, which should only be done by the educated and duly qualified physicians.

Resolved, that in the opinion of the American Medical Association, as represented by this Conference, the effort of the self-styled optometrists to obtain such legislation should be discouraged and opposed in every legitimate manner and upon all proper occasions.

GEORGE W. GAY, Boston, Mass.,

*of the Legislative Committee of the
American Medical Association.*

A resolution was passed appointing a committee to present to the different medical services of the Government and the District of Columbia the conditions of distress under which the widow of the late Dr. James Carroll is placed and suggest or help to devise such plan and action as may speedily bring relief. It is well known that Dr. Carroll died as the result of investigations which demonstrated that yellow fever is transmitted by a species of mosquito. Mrs. Carroll was left with a large family and with scanty means of support. The committee appointed by the Council has since appealed to the different state societies to contribute to this very worthy object.

Reports were made by the members present from the different states, all of whom carried from the meeting a fund of valuable information in relation to the matters under consideration.

Respectfully submitted,

E. J. McKNIGHT.

Meeting adjourned until 5 P. M.

AFTERNOON SESSION, WEDNESDAY, MAY 26, 1909.

The meeting was called to order at 5 P. M. by the President, Dr. Seldom B. Overlock. There were present Dr. Oliver C. Smith, Dr. Gould A. Shelton, Dr. Frank K. Hallock, Dr. Thomas F. Rockwell (councilors), and Dr. Frederick B. Willard, Dr. Harry B. Rising, Dr. Erastus P. Swasey, Dr. Phineas H. Ingalls, Dr. Michael H. Gill, Dr. John H. Rose, Dr. Matthew C. O'Connor, Dr. Augustin A. Crane, Dr. Charles W. Gaylord, Dr. William H. Carmalt, Dr. Frank W. Stevens, Dr. James D. Gold, Dr. William J. Tracey, Dr. Charles C. Gildersleeve, Dr. Robert C. White, Dr. Robert Haven, Dr. Charles E. Stanley, Dr. Frederick W. Walsh (delegates), the President and the Secretary.

(15) Miscellaneous Business.

DR. WILLIAM H. CARMALT (New Haven): I move that the Committee on Psychopathic Wards in General Hospitals be

discontinued, as either there is not enough in the subject itself or the people do not take sufficient interest in it.

The motion was seconded and carried.

The report of the committee appointed in the morning to consider the suggestions contained in the report of the Chairman of the Council was presented by Dr. Carmalt, the Chairman of that committee, who said:

"Both the recommendations of the Chairman of the Council are approved by the committee. The Secretary, I believe, has the text of the report."

The Secretary then read the text of the first amendment to the by-laws, proposed by the Council. It was as follows:

The amount of the annual assessment per member shall be fixed by the House of Delegates (Chapter X of the By-Laws).

It was moved and seconded that the first amendment be accepted.

THE SECRETARY: The amendment will have to lie on the table a day and be passed at the next session of the House of Delegates. The second amendment is as follows:

These By-Laws may be amended at any annual session by a majority vote of all delegates present at that session after the amendment has been laid on the table until the next annual session. If, however, the proposed alteration has been published in the notice of the session, it may be acted upon after it has laid on the table one day (Chapter XIV of the By-Laws).

It was moved and seconded that the second amendment be accepted.

THE PRESIDENT: This amendment, also, will lie over until to-morrow.

DR. E. J. MCKNIGHT (Hartford): A committee was appointed this morning by the Committee on Public Policy and Legislation, to offer a resolution as to the formation of one medical examining board instead of three. I wish, therefore, to offer this resolution:

WHEREAS, There now exists in the State of Connecticut three separate and distinct Examining Boards, each having the power of

examining and passing upon the qualifications of candidates desiring to practice medicine in the State; and

WHEREAS, The present conditions are not conducive to a high standard of medical practice in the State and interfere with the establishment of reciprocal relations with other States;

Resolved, That we, the undersigned, a Committee appointed by the Committee on Public Policy and Legislation of the Connecticut State Medical Society to consider the matter, respectfully request the said Connecticut State Medical Society to take such action as may be necessary to secure the establishment of a single Examining Board in this State.

E. J. MCKNIGHT,

C. J. FOOTE,

ELIAS PRATT,

Committee.

DR. PHINEAS H. INGALLS (Hartford): I should like to ask the sub-committee of the Committee on Public Policy and Legislation whether they have in contemplation an act to cover this?

DR. E. J. MCKNIGHT (Hartford): We did have a draft of an act satisfactory to the Homeopathic Society and the Eclectic Society; but before they could have a meeting to ratify it, their only member on the Board of Health was taken off, and they got angry and would not do anything. It seems to us that if a committee be appointed to take the matter up and report to the next meeting, it can be submitted to the Legislature the following year. No legislative work will be done for two years.

DR. PHINEAS H. INGALLS (Hartford): I was about to make a motion that the Committee on Public Policy and Legislation make a draft of such a resolution as they would like to have passed, and submit it to us at the next annual meeting.

The motion was seconded and carried.

THE SECRETARY: I have received two communications—one from New Haven County, requesting that the dues of Dr. B. L. Lambert be remitted, and the other communication from Litchfield County, asking that the dues of Dr. J. C. Kendall of Norfolk be remitted.

It was moved and seconded that the dues of both these gentlemen be remitted. Carried.

DR. JOHN H. ROSE (Hartford): This morning, in our reports, we heard from our delegate to the National Legislative Council and, if you remember, our representative, Dr. McKnight, spoke of the expenses of his trip. Contrary to his wishes, I want to say that he should be reimbursed to the extent of his entire expenses. We should allow more than twenty dollars for a three days' trip to Washington. If other states pay their delegates, we can. I should like to open up this matter, and to make a motion that we reimburse our delegate for his expenses and allow him twenty dollars a day.

THE PRESIDENT: The motion has been made that the delegate to the National Legislative Council be paid twenty dollars a day, for three days.

DR. E. J. MCKNIGHT (Hartford): I think it should only be for necessary actual expenses. I make this as an amendment.

The amendment of Dr. McKnight was seconded.

THE PRESIDENT: Then it is moved that the delegate should render an account of all his expenses while attending the Council, and that the bill be paid.

THE SECRETARY: There is going to be a pharmacological convention in Washington and we are entitled to send a delegate. At the last one, in 1900, two delegates were sent from Connecticut, one from Yale and one from the Pharmaceutical Association. This year, state medical societies are permitted to send delegates, and we are entitled to one.

The Secretary then read the communication regarding it.

DR. PHINEAS H. INGALLS (Hartford): I make a motion that if anyone expresses a desire to attend this convention, the Secretary be empowered to give him the proper credentials.

An objection was made that this was rather a loose way of doing business, and it was suggested that it would be better to leave it to the Council to select a delegate. This amendment was accepted by Dr. Ingalls, and the motion was seconded and carried.

THE SECRETARY: Our member of the National Legislative Council has already appealed to you for the relief of Major Carroll's wife and family, but Dr. Green of the American Medical Association has appealed to me to bring it before the Society at this meeting, and that is why I mention it now.

DR. FRANK K. HALLOCK (Cromwell): I move that the matter be referred to the Council, and that they report upon it to-morrow. The motion was seconded and carried.

DR. CHARLES C. GILDERSLEEVE (East Woodstock): Is it proper at this time to act on the recommendation contained in Dr. Gill's paper? Perhaps you did not notice that he recommended the passage of a law in regard to ophthalmia neonatorum, or gonorrheal ophthalmia. It seems to me a matter that we should take up. He stated that the law should require a report of all births to be made within twenty-four hours. I suppose that he meant where there was a suspicion of gonorrheal ophthalmia.

DR. ERASTUS P. SWASEY (New Britain): When I was in the House of Representatives in 1895, I remember that there was a bill of this kind before the committee. It was passed and is now on the statute books. There have been one or two prosecutions under this law, which occurred within two or three years after its passage. It requires the nurse, if a doctor is not in attendance, to report, within twenty-four hours after the first appearance of running of the eyes, to the health officer, and either he or some physician in attendance must treat the child. In one case, the failure of the nurse to comply with this regulation resulted in her arrest and confinement. Unless this law has been repealed, it is still on the statute books.

DR. CHARLES C. GILDERSLEEVE (East Woodstock): I should like to ask whether, if no midwife or physician is in attendance, is this obligatory on the father and mother?

DR. ERASTUS P. SWASEY (New Britain): Yes, or anyone in attendance.

DR. MICHAEL H. GILL (Hartford): My suggestion was that all births be reported within twenty-four hours. The law now allows thirty days. The births should be reported, irre-

spective of any gonorrheal ophthalmia. There is such a movement on foot in New York, to compel the reporting of all cases. I think that Dr. Swasey is right about the specific legislation in regard to gonorrheal ophthalmia. It takes about three days for this to develop; and if the births are reported within twenty-four hours, this will give the health officer time to examine the child and, if he finds it necessary, to instill nitrate of silver. The report should be accompanied by a specific statement as to whether or not silver nitrate has been instilled, but the proper legislation cannot be secured immediately.

DR. CHARLES C. GILDERSLEEVE (East Woodstock): That is the law now, and the name of the child is to be given.

DR. PHINEAS H. INGALLS (Hartford): I move that the resolution in Dr. Gill's paper be referred to the Committee on Public Policy and Legislation.

The motion was seconded and carried.

It was moved that the House of Delegates adjourn, to meet at 8.30 A. M. on Thursday, May 27.

The motion was seconded and carried.

MORNING SESSION, THURSDAY, MAY 27, 1909.

The meeting was called to order at 8.40 A. M. by the President, Dr. Seldom B. Overlock. There were present Dr. Oliver C. Smith, Dr. Charles S. Rodman, Dr. Gould A. Shelton, Dr. Edward H. Welch, Dr. Frank K. Hallock (councilors), Dr. Frederick B. Willard, Dr. Harry B. Rising, Dr. John H. Rose, Dr. Matthew C. O'Connor, Dr. Augustin A. Crane, Dr. Charles W. Gaylord, Dr. William H. Carmalt, Dr. Frank W. Stevens, Dr. James D. Gold, Dr. William J. Tracey, Dr. Charles C. Gildersleeve, Dr. Robert Hazen, Dr. Frederick W. Walsh (delegates), the President and the Secretary.

The minutes of the sessions on the previous day were read by the Secretary and accepted.

The next business before the House was the election of officers. The Board of Councilors, acting as a nominating committee, presented a list of officers for the ensuing year. (See page 16).

The list was read by the Secretary.

There being no other nominees, Dr. William H. Carmalt (New Haven) moved that the report of the Board of Councilors, acting as a nominating committee, be accepted, and that the Secretary be authorized to cast a ballot for the election of those nominated.

The motion was seconded and carried.

The Secretary reported that he had cast the ballot for said list of nominees.

THE PRESIDENT: I declare these gentlemen elected as officers of the Society for the ensuing year.

The deferred business was then taken up.

THE PRESIDENT: No action has been taken on the report of the Committee on Venereal Diseases.

DR. W. H. CARMALT (New Haven): I do not think that this committee should be discontinued, unless they do not wish to serve any more.

THE PRESIDENT: I gather from their report that they think it impossible to carry out the plan of action.

DR. J. H. ROSE (Hartford): Let the committee be continued, but reappointed each year; and perhaps, some time, some aggressive man may see a chance to do something in regard to the matter, which I think is very important. There is a good deal of agitation in local societies about this matter.

It was finally moved and seconded that the Committee to Consider the Best Method for the Control and Prevention of Venereal Diseases be dropped. Carried.

DR. FRANK K. HALLOCK (Cromwell): I think that it would be a good thing to discontinue the Committee on Epileptic Colony and appoint another; although the present committee has not finished its work, and we still have a hearing before the legislative committee. As one of the former committee, I begin to feel discouraged, and I think that someone else might do better in my place.

THE PRESIDENT: That committee is aiming at something tangible, and I see no reason why it should be discontinued.

DR. GOULD A. SHELTON (Shelton): Would it not be unwise to discontinue the committee while the question is before the

Appropriation Committee? The work before that committee would then fall flat. I favor the continuance of the committee. We may not accomplish anything this year; but, by keeping the matter before the people of the State, something may be accomplished. I feel that it was a mistake to ask for so large an appropriation. A smaller one might have gone through. It is not necessary to buy the largest farm in the State. Begin in a small way, and increase from time to time, as necessary. I do not believe in discontinuing the committee.

It was then moved and seconded that the Committee on a Colony for Epileptics be continued.

THE PRESIDENT: I want to say that the Committee on Public Policy and Legislation ought to meet earlier and elect their chairman, because the President of the State Society is always requested by the American Medical Association to name the chairman as a member of the Committee on National Legislation. Last year, things were somewhat mixed up, because this was not done.

Under new business, the next thing to be considered is the time and place of meeting next year.

DR. FRANK K. HALLOCK (Cromwell): I make a motion that the next annual meeting be held in New Haven on the fourth Wednesday and Thursday of May, 1910.

The motion was seconded and carried.

THE PRESIDENT: The next matter is to determine the amount of the assessment.

It was moved and seconded that the assessment for the coming year be three dollars. Carried.

Someone asked whether the financial condition of the Society was sufficiently good to cover all expenses with such a small assessment.

THE PRESIDENT: It will be for another year. Two years from now, some matters will come up for discussion that may require an increase in the amount, so perhaps it will be just as well to let it go for the present.

THE PRESIDENT: The amendments come next.

The Secretary read the first amendment recommended by the Council. It referred to the amount of assessment, and was as follows :

The amount of the annual assessment per member shall be fixed by the House of Delegates (Chapter X of the By-Laws).

It was moved and seconded that the amendment as read be adopted. Carried.

The Secretary then read the other amendment, which was to Chapter XIV. It referred to amendments to the by-laws, and was as follows :

These By-Laws may be amended at any annual session by a majority vote of all delegates present at that session after the amendment has been laid on the table until the next annual session. If, however, the proposed alteration has been published in the notice of the session, it may be acted upon after it has laid on the table one day (Chapter XIV of the By-Laws).

It was moved and seconded that the amendment as read be adopted. Carried.

DR. AUGUSTIN A. CRANE (Waterbury) : I have been requested to offer the resolution contained in Dr. Simpson's paper.

DR. W. H. CARMALT (New Haven) : Is it not proper for us to act on the expert testimony bill now?

THE PRESIDENT : Yes ; we will act on it before taking up the other matter.

THE SECRETARY : The Council recommended the enactment of the following bill ; that it be taken up by the Committee on Public Policy and Legislation, and that they endeavor to have it passed by a suspension of the rules.

The bill referred to the appointment of medical experts, and was as follows :

AN ACT CONCERNING MEDICAL EXPERT TESTIMONY.

Be It Enacted by the Senate and House of Representatives in General Assembly Convened :

SECTION 1. Any judge of the Superior Court may, upon his own initiative or upon the request of either party to any action involving medico-legal questions, appoint a commission of one or more physicians to act as experts.

SECTION 2. Only physicians who are graduates of some reputable school of medicine and have been in practice at least five years, shall be eligible to appointment to such commission.

SECTION 3. Such commission shall act as medical experts concerning any question that may arise in the trial of such action, and, whenever requested by the Court to do so, shall express an opinion as to the significance of other medical testimony offered in such trial.

DR. GOULD A. SHELTON (Shelton): We have not heard from the Committee on Public Policy and Legislation, and I do not know whether it can be gotten through at this session of the Legislature or not. I showed it to the Chairman of the Judiciary Committee the other day, and he thought it a good thing. This, I judge, is copied after the New York law in its legal phrasing, though its material is different. Mr. Burd said that it could originate in the committee, but I told him that I thought we had better wait until we saw what action resulted.

DR. OLIVER C. SMITH (Hartford): What states has this law been tried in?

DR. GOULD A. SHELTON (Shelton): I do not think that it has been tried at all. They have a bill before the New York Legislature, but I do not think that it has been acted on. The New York Legislature appointed some sixty men throughout the State, which is all right in proportion to the size of that State. I think that such a bill will pass before the Judiciary Committee, although the lawyers are always opposed to it.

THE PRESIDENT: I have been told that the judges are in favor of it, and that the bar oppose it.

It was moved and seconded that the matter be referred to the Committee on Public Policy and Legislation. Carried.

DR. AUGUSTIN A. CRANE (Waterbury): This is the resolution of Dr. Simpson's that I was about to read before: "It was moved that a committee of five be appointed by the chair to endeavor to secure coöperative action with the Connecticut Bar Association in the passage of a bill through the Legislature which shall modify the present method of the employment of experts in medico-legal cases."

DR. W. H. CARMALT (New Haven): I suggest that the present Committee on Public Policy and Legislation attend to it.

DR. GOULD A. SHELTON (Shelton): That was my idea, to have it referred to that committee. It is better to have one committee. The matter is entirely in line with the bill just discussed.

THE PRESIDENT: We can refer it as a resolution to that committee.

It was moved and seconded that the matter of the resolution contained in Dr. Simpson's paper be referred to the Committee on Public Policy and Legislation. Carried.

Dr. Carmalt was then asked whether he had not a resolution to offer.

DR. W. H. CARMALT (New Haven): I am not prepared with a resolution. I thought I could present the idea in my paper. Until that paper is read, the men would not know what I was talking about. However, I will say a few words about it now.

There is a bill before the present House of Representatives—House Bill No. 613, I think. It was introduced by Representative Tomlinson from Danbury, and concerns the sterilization of criminals and imbeciles. I have not the wording of the resolution before me; but a similar law has been passed in Indiana and, I understand, in Oregon, also. I cannot go into an argument about it now, because it would be a repetition of my paper; but the object is to see whether we cannot stop the breed of habitual criminals guilty of sexual crimes, and of imbeciles and inebriates. This is in line with a law already passed preventing marriage in some instances.

In some states there is a law compelling the segregation of women during the marriageable age; but that is not enough. I want it applied to both sexes.

I move that the House of Delegates recommend to the Judiciary Committee of the Legislature the passage of the House Bill introduced by Mr. Tomlinson, and, secondly, that the Society place themselves on record as in favor of this bill for the sterilization of criminals and imbeciles.

DR. OLIVER C. SMITH (Hartford): Would it not be well to have this bill read? It might contain some clause that we would not favor.

DR. W. H. CARMALT (New Haven): I have not a copy of it with me. The only thing about it that is objectionable is that it does not go far enough. It applies only to vasectomy, and I want it applied also to castration. I think, however, that this is a detail that could be left to the committee, whenever it is appointed. Whatever the Judiciary Committee decide, should be done. The matter could be left to the judgment of whatever committee is appointed.

Dr. Carmalt's motion was seconded and carried.

DR. FRANK K. HALLOCK (Cromwell): The question of the subscription to the Carroll fund was referred to the Council, and the Council report that they do not feel authorized to recommend a contribution from the general treasury of the Society; but they would recommend that the members contribute voluntarily to the fullest extent possible, so that our Society may make as good a showing as we can and help this movement. The matter is really left to the men of the Society as individuals.

THE PRESIDENT: Will you make a motion to cover this recommendation?

DR. FRANK K. HALLOCK (Cromwell): Dr. Carmalt suggests that a special committee be appointed to raise funds. I make a motion that the Chair appoint a committee of three to endeavor to receive money for the James J. Carroll Fund. Seconded.

DR. AUGUSTIN A. CRANE (Waterbury): I would suggest the substitution of the word solicit for the word receive. If they only receive, the contributions will come in slowly.

The amendment was accepted and the motion carried.

DR. W. H. CARMALT (New Haven), Dr. Frank K. Hallock (Cromwell), and Dr. Walter R. Steiner (Hartford), were appointed by the Chair for this purpose.

DR. FRANK K. HALLOCK (Cromwell): I shall have to ask to be excused from serving on this committee, as I shall be in Europe this summer. I sail very soon.

THE PRESIDENT: I appoint Dr. James M. Keniston (Middletown) in Dr. Hallock's place.

DR. FREDERICK B. WILLARD (Hartford): I move that the Secretary be allowed such expenses, to the amount of one hundred dollars, for the employment of a stenographer and the purchase of a typewriter for the routine work of his office. I think it is a pity that the Society should not allow its Secretary a typewriter.

The motion was seconded.

DR. FRANK W. STEVENS: Is this for the ensuing year alone?

The question was answered in the affirmative and the motion was carried.

DR. MATTHEW C. O'CONNOR (New Haven): I should like to get an expression of opinion from the members regarding reciprocity between New York and other states regarding licenses.

THE PRESIDENT: This will have to come through the one-board bill, which is under consideration. This bill is in the process of being worked out now.

DR. AUGUSTIN A. CRANE (Waterbury): There is a matter that for twenty years has appealed to me in regard to the manner of conducting our practice in this State, and it has only just occurred to me that I am now in a position to set the ball a-rolling. We are compelled by law to issue reports of births and deaths, and they pay us for doing this. We are also liable to arrest, if we do not do it. We are also liable to arrest if we do not report cases of contagious diseases, but we get no pay for doing so. I doubt whether this is legal; and if the matter were referred to the courts, I doubt whether we could be made to do something that we are not paid for. I move that the Committee on Public Policy and Legislation be asked to see that a bill is presented to have physicians paid for reporting contagious diseases in the same way as they are now paid for reporting births and deaths.

The motion was seconded and carried.

The House of Delegates adjourned at 9.20 A. M.

The Banquet.

The annual banquet was held at the Allyn House, on Thursday evening, May 27, at 7.30 P. M. One hundred and forty members of the Society were present. Dr. Frederick S. Crossfield acted as toastmaster. The following were the speakers:

MAYOR EDWARD W. HOOKER,
DR. SELDOM B. OVERLOCK,
HON. JOSEPH L. BARBOUR,
REV. ROCKWELL H. POTTER,
DR. GEORGE C. F. WILLIAMS.

PRESIDENT'S ADDRESS.

The President's Address.

SELDOM B. OVERLOCK, M.D., POMFRET.

As each year passes and the time for the annual meeting arrives, the Connecticut State Medical Society adds another stone to the column of its years. We of the first decade of the twentieth century should not view with complete complaisance the blocks we are adding to this column, smooth and polished, perchance, when compared with those nearer the base. The work of the men who founded this Society was cut true to the line and has always stood a reliable foundation for the achievements of those who have come after them. The transition in the make-up of the Society is so gradual that change is hardly apparent, yet constantly old faces are gone and new ones take their places. In the past, so many men of eminence in the profession in the State have filled the executive chair, that I am more and more, through these associations, impressed with the responsibility of the position and more fully appreciate the honor that is conferred upon the man who may be elected to the office of President of this Society.

The President's address at these annual meetings is something, or should be something that pertains to the medical profession alone, or something that pertains to the medical profession in its relation to the community at large. This should be so from the fact that while the medical man of to-day does not occupy in the community, along with the clergyman, a position of peculiar reverence and mystical deferential respect, as in the past, he yet has an intimate relation with and potent influence upon matters not directly connected with the practise of his profession. This is a practical age, an age of specialism in everything. Consequently, the medical man is taken for what he is worth to the community from the special knowledge and ability that he is supposed to

possess and that has been acquired from technical education and special experience.

An address that would be of interest to you from a purely scientific standpoint should come from a master in some particular branch of medicine or surgery. This I will not presume to attempt. Hence I will follow the second plan and select a subject pertaining to the medical profession and to the public as well. This subject is the small general hospital.

In considering the subject of the small hospital, it will be necessary to adopt a somewhat arbitrary standard in the definition of such an institution. In the present connection there shall be meant a hospital whose average daily quota of patients is less than fifty and whose acting staff is composed of men not connected with larger hospitals. This definition is made thus in order that private institutions in our larger cities and elsewhere may not be included in consideration of the subject. Of the hospitals of this country about ninety per cent. are included in the above category.

The small general hospital is a development of the last quarter of a century or less. Previous to that time, patients requiring hospital care, either in cases of emergency or selection, were obliged to be transported long distances to the larger cities. In emergency cases, this was often done, to the added suffering and detriment of the patient. The need of local hospital facilities for the immediate care of persons injured by accident became more and more apparent, to the local surgeon especially, and this need through him was impressed upon the public, and the result has been the establishment of many, so-called, small hospitals.

These have nearly all been built and maintained by a combination of private contributions, help from nearby towns by these towns establishing free beds for their needy citizens, and all usually supplemented by aid from the State.

The success and efficiency of a small hospital, while depending upon circumstances, local conditions and surroundings that go to make up the success of any hospital, have features that depend on itself wholly or in part.

In order to discuss the matter in detail, it may be said that the success of the small hospital depends upon building and location, equipment and management, the nursing force, the *entente cordiale* between the staff and the practitioners in its vicinity, and the staff itself.

In many instances, in the beginning, from lack of funds, the buildings are not ideal. Sometimes an ordinary dwelling has been metamorphosed and additions made to constitute a hospital building. In every instance where this may have been done, there remain objectionable features that impede and impair the work of the hospital. Again, when a new building has been erected, the work has often been entrusted to men who, from previous experience, know nothing of hospital construction. The result is a building lacking internal symmetry, economy of space and sequence of arrangement of its various parts, and lack of acoustic properties so necessary to the comfort of patients. There are instances of such construction where fumes of the anæsthetic during an operation penetrate the wards and private rooms, much to the discomfort of patients possibly operated upon on the preceding day. The acoustic properties should always be considered. If every sound in the building is transmitted from one part to another, it can but be a disturbing element and not conducive to the progress and recovery of patients. In small hospitals where space is limited, especially should care be taken in respect to this. At present, however, it is a frequent and glaring defect, and emphasizes the fact that the construction of a small hospital should always be under the supervision of a competent architect.

In equipment the small hospital is likely to suffer in many ways. There is nearly always a lack of funds, hence economy and selection must rule in procuring articles of equipment and operating-room armamentarium. In equipping a hospital of this class several elements will enter as participants, all anxious to aid, but often unintentionally antagonistic. The board of trustees, the woman's board, the staff, all have to do with the matter and all are usually without practical experience. Those, beside the staff, try to make use of previous experience gained

in business or otherwise, and this general experience never can satisfactorily apply to hospital equipment. Members of the staff are usually men who, as internes in previous years, were familiar with the equipment of large hospitals only. Consequently their ideas of equipment are on a larger scale than the smaller hospital requires, or for which the funds at hand are adequate. In consequence of these various factors working together or, rather, working at the same time, for one object, much is obtained that time and use show to be inadequate or ill adapted to the needs of the service of the hospital. Fortunate, indeed, is the small hospital that at the start secures a practical working equipment.

A laboratory is an essential part of the equipment of every hospital. In every small hospital this is nearly always incomplete in equipment and imperfect in its working potentiality. It goes without question that a laboratory is an aid to the staff in diagnosis and in making up full histories of the progress and results of cases. To make up a fair and well-rounded result, the work of the pathologist and surgeon should go on together, step by step and hand in hand. The material furnished the pathologist by the small hospital is, of necessity, limited, but there is no hospital in this State so small but that it would furnish abundant material to an enthusiastic pathologist if he were fully interested in his work.

Hospitals in small towns usually have an advantage in location denied to institutions in larger cities. This secures better air, sunshine in abundance, and quiet—potent factors in securing good results in wound repair and treatment of disease.

It often happens in business that small enterprises require more careful management than those of the same kind when more extensive. This is also markedly true in hospital affairs. In either case there should be but one person to control the internal administration. The duties and privileges of such a superintendent, as well as of staff, nurses, and patients, should be defined by a set of rules. These rules should be based, originally, upon the experience of hospitals in general. They should be modified and amended from time to time so that

they may the better apply to local conditions and changes that may arise. Above all they should be explicit.

No general hospital of less than fifty beds should attempt a training school for nurses unless in affiliation with larger schools. A less number of patients, were they used by a genius in preparing women for the nurse's profession, might be sufficient; but in most instances, a training commensurate with that given by the larger institutions cannot be obtained. The technical nurse is needed only in limited numbers and in comparatively few positions. In which positions, I may add, she is of inestimable value to many of us. The rank and file of the medical profession and the community at large need the practical nurse, one who has more of general experience in the care of the sick than of theory. This experience cannot be obtained by the clinical material furnished by the average small hospital. If possible, graduate nurses should be employed in these. This is especially important in such as do not have internes.

The friendly spirit and interest in the hospital shown and maintained by members of the medical profession in its sphere of influence is of utmost importance to its success.

I visited a small hospital in a neighboring state, to which an alert, energetic and skillful young man was surgeon. I observed that while the wards were filled with patients, a large percentage of whom were satisfactorily convalescing from major operations, the private rooms were for the most part unfilled. In answer to my query as to the cause of this, the surgeon answered: "The charity patients are sent here, the pay patients otherwheres." This illustrates per contra what was meant by "*entente cordiale*" in the beginning of this paper. Any physician who pursues such a course as this is either doing an injustice to the hospital or to a part of his patients. Either the hospital is doing good work or it is not. If doing good work, it is worthy of the pay patients in its vicinity; if it is not doing good work, no conscientious man should send to it his charity patients. The man who holds in less regard the life and limb of a patient because he is in needy circumstances is less "a man for a' that," and is unworthy of the ideals of the

medical profession. The hospital should make every endeavor, through good work and uniform courtesy, to aid physicians not on the staff in caring for their patients who cannot be properly cared for in their homes, and the outside physician, in turn, should do all he can to aid the hospital. It is a laudable and at the same time a pleasing fact that in the majority of cases the local hospital has the full support of the reputable men in its locality.

Originally the staff of the smaller hospitals was made up of nearly all the practitioners in its immediate vicinity. The service was not divided into medical and surgical, as in the larger hospitals. Every man during his term of service attended to both branches of the service. This plan seemed necessary, when, in the beginning, there were but few patients. As the number of patients increased, the general plan of division has been instituted, much to the good of the service. It has long been a demonstrated and accepted fact that different men in the medical profession, as in all other work, show especial skill and excellence in different branches. This is as true in the smaller towns as in the larger centers. Every small hospital should bear this in mind when selecting and appointing its staff.

In discussing the surgeon to the small hospital, I can do no better than by giving an outside estimate of his faults. Ten years ago, I asked a prominent metropolitan surgeon, who was at the same time consultant to several small hospitals in nearby towns, what, in his opinion, was the principal fault in the surgeons to the smaller hospitals. He replied, "Attempts to perform operations beyond their ability and in which they have not had sufficient previous experience." I fully agree with him that at that time the statement was a true one. At the risk of provoking adverse criticism, I will say that, in my opinion, some of the various post-graduate courses in this country and elsewhere were responsible for this. In order that any man may lay a proper foundation for good surgical work, that he may acquire surgical touch and surgical judgment, he must follow along step by step in intimate contact with a master in the art.

He cannot gain knowledge sufficient to warrant him undertaking major operations by simply watching, from the amphitheater seats, the work of another. Simply watching surgical work, supplemented, perhaps, by a short course of operation on the cadaver, never made a surgeon, as it is often supposed to do by many who take such a course. Men who conduct these courses may be men of ability, but the paucity of time devoted to these courses and the exaggerated idea of the amount of benefit that may be derived from such a course by many who have taken it is open to criticism.

The surgeon to the small hospital should be a man of many parts. He should always be, like the locksmith of the immortal Balzac, a man "who does what he says but does not say what he does." It is to be feared that he does not always equal the requirements of such a standard. Much depends on him in winning the inhabitants of the smaller communities to an appreciation of the benefits of a hospital. People on the whole accept it as an unquestionable fact that a person has an inalienable right to die from disease when under strictly medical treatment; under surgical treatment it is more often thought that he dies from the operation rather than the disease for the relief of which an operation may have been done. Hence the man who has to do with the operative work in a small hospital has a greater part in forming public estimate of the hospital than the man who cares for the strictly medical cases.

From the fact that many times the surgeon to the small hospital has to form an opinion for himself alone and act upon the opinion thus formed, he often becomes opinionated, on the one hand, or vacillating in opinion on the other. He may carry through without mortality, perchance, a small series of cases in which general statistics show a high death rate. He infers from this that he has found a way by which this given operation can be made innocuous. In his next series of like number and in cases of like character he may meet his Waterloo with a mortality of a hundred per cent. On the other hand, failure to secure satisfactory results, or a high mortality may, for a time, make him exceedingly chary in undertaking perfectly legitimate operations.

The surgeon to the smaller hospital is usually a man who is at the same time keeping up in part a general practice, consequently he should be a man of good physical endurance and whose nervous capital is plentiful and not easily exhausted. In ability, he should be on a par with the average surgeon in the larger places. No longer can the amputation of a thigh be considered a masterpiece sufficient to establish his reputation as a surgeon. No longer report of an operation of this kind is heralded up and down the countryside to establish his renown forever afterwards. Modern means of communication make him the near neighbor of his city colleague miles away. His work, especially if unsatisfactory to the patient, is soon presented for inspection, judgment, or criticism, as the case may be, to some man prominent in the profession. In consequence he must be conversant with the accepted technique of the day and all its constant mutations. To do this, even imperfectly, he must read constantly of the best current literature and at every opportunity visit the clinics in surgical centers.

The final question in relation to this discussion of the small hospital is this: Is it a legitimate institution, has it a comparative right to be? Men connected with the larger institutions from rare good-will and innate courtesy—and these have always been evident—do not publicly express an opinion on the above question. It may not seem entirely fitting, either, that a man connected with a smaller hospital should venture an opinion. But in order that an opinion may be expressed, if for no other reason, I will answer in the affirmative. I will not burden you with statistics, but simply say that in so far as I am able to read statistics or draw conclusions from them an affirmative answer is warranted. This can be proved absolutely, as far as comparative mortalities are concerned; comparative results, in so far as they pertain to the preservation of health and usefulness, cannot be estimated. This part of the work of every hospital must always remain under judgment.

A word may be said here that applies to all hospitals, great and small. The sums of money expended in the construction and maintenance of hospitals is beyond estimation or computa-

tion. The wealthy magnate and the laborer unite in spirit and in purse to aid the hospital. Its place and mission are so apparent to men of all degrees that its existence and its work is accepted as a matter of course along with the Church, the State, and the school. The man who makes the claim that the hospital is the penance of the rich for the wrongs done the poor is a carping and abusive pessimist unworthy of consideration in the philanthropic age in which we live. Rather the hospital of the present represents the broad Christianity of the century—a cup of water to the little one, the Samaritan binding up the wounds of him who fell among thieves. It is a rare exception that a bid for renown is covertly hidden in a hospital endowment. These men and women who found and maintain hospitals are by proxy the guardians of the throngs that daily pass in and out of the doors of these institutions. This mass of human wreckage, battered and marred by every disease known and unknown, brought on by voluntary vice or induced by the hardships of toil and misfortune, are all alike received and cared for here.

The hospital is the conservator of correct theory and the demonstrator of correct practice in the treatment of disease. Here, under the care of trained and efficient observers, new theories and new practices are fully tried and proved either safe and of value or laid aside as failures or incompetent. Extravagant claims may be put forth for some drug or for some new surgical procedure—these must all be accepted or rejected largely under hospital judgment and decision. Against those ultra forms of pretended healing processes—due to the hysterias always present in all ages of the world's existence—they must always act as an influence restraining the public from harm through its own delusions. Many men may run after new things and new delusions, or old delusions appearing in new form and garb, as they have done since written history began to make record of mundane events and chronicle the acts of man. The delusion may have to do with sacred relics or the amulet worn by the savage; they may be crude in conception, or refined in the manner and means of

exploitation; they may be conceived in the fertile brain of the charlatan, fierce with a lust for gain, or pieced together in the disordered imagination of the mystic—it matters not what they may be or where engendered, all will have devotees and followers. As long as mind influences matter, as long as will influences weaker wills, as long as mankind is prone to follow leaders without knowing—many times not wishing to know, whether these leaders are good or bad, just so long will this condition remain in the world. Through it all the hospital has and always will form a nucleus for work where progress is prominent and the best effort is constantly put forth for legitimately relieving suffering and prolonging life.

All credit should be given to individuals, to municipalities, to the State, for the part that each and all have done and are doing for the support of hospitals, both great and small; but when this has been given to the fullest extent, let no one forget that to the medical profession belongs the chief and fullest honor and responsibility in the work of the hospital. The hospitals of the world demonstrate daily to the public the skill, the assiduous labor of body and mind of our profession. The labor of the medical profession here is and has been given so freely and without stint that the public look upon it as a matter of course. They do not stop to think of the financial gain to the State, in working energy, of every limb saved and life of usefulness prolonged. To the man who has grown old in the work of our profession, though he may have gained great honor with his colleagues and fame in the world, his greatest and most satisfactory reward must be the good he has accomplished for others. To the medical profession in the past, present, and in the time that is to come, the world owes an inestimable debt for its work in the hospitals. This claim is not self-laudatory on the part of the medical profession. It is the mead due to that profession for untiring work, self-sacrifice and persistent and conscientious endeavor, of priceless value to the public. The medical profession have a right to-day to challenge for this work the admiration and homage of the world.

PAPERS ON SPECIAL
SUBJECTS.

Bacterial Vaccines in the Treatment of Disease.

C. J. BARTLETT, M.D., NEW HAVEN.

At a meeting of the Pathological Society of London, eight years ago, Wright (1) reported a case of boils successfully treated by a killed staphylococcus culture. In a footnote accompanying the report of the meeting he says, "The anti-staphylococcus vaccine referred to above would appear to have an application in connection with the treatment of furunculosis and in connection with the production of increased resistance of patients whom it is proposed to submit to operations which involve a danger of sepsis." The following winter, Major Leishman (2) described a method of quantitatively estimating the phagocytic power of the leucocytes in the blood. Wright modified the technique employed by Leishman and, together with his co-workers, developed the method of increasing the resistance of the body to bacteria by the use of bacterial vaccines, and of determining to some extent the degree of this resistance (3). This is now commonly known as the opsonic method. From this as a beginning the work has been widely taken up. Comparatively little has been contributed by the French and German investigators, but in England and in America, an extensive literature on this subject has appeared.

While we propose to confine ourselves closely to fact, in contrast to theory, it is essential to hold clearly in mind the principles upon which the treatment of disease by bacterial vaccines is based. This vaccine therapy has nothing in common with serum therapy. In the latter, there is injected into the patient an antitoxin, a substance already formed, which will directly neutralize the toxic bacterial products. This antitoxic serum therapy, though it has given brilliant results in a few diseases, appears to be very limited in its field

of application. It is employed at present chiefly in diphtheria, epidemic cerebro-spinal meningitis and tetanus.

In vaccine therapy, instead of employing an antitoxin, the bacteria themselves, against which it is desired to produce an immunity, are introduced by subcutaneous injection after having been killed by heat. For instance, if a patient has an infection with the staphylococcus aureus, a certain number of dead bacteria from a pure culture of the staphylococcus aureus are injected. This would appear at first like adding insult to injury, or like accepting as orthodox the Hahnemannian theory of *similia similibus curantur*. The underlying principle is readily understood. It is that the protective powers of the body, when properly called into action, are in themselves sufficient to establish an immunity against the offending bacteria which have invaded the tissues and to bring about their destruction. Living bacteria, as they grow in the body in producing disease, frequently fail for some reason to stimulate the body to a prompt production of immunity of a sufficient degree to stop the infectious process; the individual's resistance to the offending organism is for the time being below normal. On the other hand, dead bacteria of the same kind, given subcutaneously in proper numbers and at appropriate intervals, furnish the necessary stimulus for the production of this increased resistance. An immunity against that particular organism is thus established. This method of producing immunity appears to be of wide application in the treatment of bacterial infections. It is evident that this treatment by bacterial vaccines is specific in the strictest sense of the word. The pneumococcus cannot call forth immunity against the gonococcus, nor can a streptococcus stimulate to immunity against a staphylococcus. Indeed it appears that one strain of streptococci often differs sufficiently from another strain of the same bacterium so that it cannot give rise to an immunity against the latter. This is to be constantly borne in mind in using vaccine therapy. Bacterial vaccines are then nothing but a definite number of dead bacteria from a pure culture, suspended in salt solution to which a minute amount of an

antiseptic has been added. And each kind of infection has its own vaccine. When these vaccines are prepared from the bacterium isolated from the patient himself, they are known as autogenous or homologous vaccines. Otherwise they are called stock vaccines. The difference in action between the autogenous and stock vaccines is at times, as will be seen later, striking.

During the process of immunization against a bacterium, a demonstrable change occurs in the patient's blood serum. In normal serum there is a something, not yet isolated, which acts upon the bacteria to prepare them for ingestion by the leucocytes. To this Wright has given the name of opsonin. As would be expected, in infections the opsonin for the offending bacterium is often below normal in amount and becomes increased as immunity is established. Wright believes that the relative amount of this opsonin present in the patient's blood, as compared with the amount present in normal blood, can be accurately determined, and this proportion between the opsonin of the patient's and that of normal blood constitutes the opsonic index. Much difference of opinion exists regarding the necessity of determining the opsonic index in the treatment by bacterial vaccines. Wright considers its frequent determination very essential in deciding upon the dosage and the frequency of the injections. He compares one who uses vaccines without following the index to the mariner sailing on unknown waters without lead and compass. Many of Wright's coworkers and followers hold the same view. On the other hand, there is a strong conviction on the part of many who have followed the opsonic method faithfully, that the determination of the opsonic index is not only unnecessary, but that the results obtained are unreliable (4, 5, 6). Trudeau (7) considers clinical symptoms and signs far more reliable indications for measuring the dose and spacing the injections than any opsonic determinations could be. Cole (7) of the Johns Hopkins Hospital says that as carried out at present the opsonic determinations are wholly untrustworthy as a clinical aid. It is no longer used at that hospital. Calmette (7) is

reported as saying recently, "It is perhaps interesting but has no practical value." Von Pirquet is known to hold similar views. The question is one of practical importance if vaccine therapy is to be employed. The determination of the opsonic index requires considerable time and can only be carried out by a laboratory expert. Its determination in every case would of necessity very greatly limit the use of bacterial vaccines. In this country the majority of physicians using vaccines are apparently disregarding the opsonic index entirely and are guided by clinical symptoms. The results seem to be as good as when the index is followed.

Staphylococcus infections. The first cases treated by this method were those of localized suppurations, and a considerable part of all the cases thus far reported have been of this nature. In these the staphylococcus aureus is more often the offending organism. The reports from nearly all who have used vaccine therapy in localized staphylococcus infections is favorable to that form of treatment. In acute boils and carbuncles, the effect of injecting dead staphylococci is seen quickly. There is marked diminution in pain and tenderness. The discharge becomes more profuse and continues until the focus clears up. When the pus is still confined, a small opening only need be made to allow its escape, thus preventing any considerable scar. According to Wright (8), antiseptics should not be used, as they counteract the effects of the opsonins. Hartwell and Lee (9) emphasize the especial value of this treatment with boils about the face to prevent scarring. Whitfield (10) voices the opinion of those who have used staphylococcus vaccines in the treatment of general furunculosis when he says that it is the only form of treatment which is at all reliable. Chronic furunculosis may require vaccine treatment for some weeks before sufficient resistance is acquired, and the immunity thus produced, though lasting for some time, is not permanent. If, however, the patient will return for further treatment upon the appearances of a pus point, it is possible to permanently prevent the further development of boils. At times in chronic furunculosis, as well as in acne and

in sycosis, the offending staphylococcus is of such slight virulence that an autogenous vaccine made from it fails to give rise to immunity. In such cases, it may become necessary to combine with the autogenous vaccine a stock vaccine made from a more virulent staphylococcus.

Of the other infections due to the staphylococcus, which have been successfully treated, there may be mentioned acne, sycosis, osteomyelitis and periostitis, and severe pyorrhea alveolaris, of which Goadby (11) and others report several cases. Tuberculous sinuses, which have failed to heal under tuberculin treatment alone, frequently do much better when a vaccine made from the staphylococcus is added, this latter being a secondary infecting organism. A few cases of general septicemia or pyemia due to the staphylococcus aureus have been reported with favorable outcome following vaccine treatment. However, vaccines do not as yet offer great hope of success in this class of cases. In localized staphylococcus infections, stock vaccines appear to be satisfactory. If they fail, an autogenous vaccine should be prepared and, in general, uniformly better results will follow the use of autogenous vaccines in staphylococcus infections.

Streptococcus infections. Numerous cases of erysipelas treated by streptococcus vaccines have been reported. Weaver and Broughton (12), using a stock vaccine, saw no appreciable effect in the acute stages of the disease, but in prolonged cases apparently a favorable effect was produced. Schorer (13), after treating thirty-seven cases, concluded that it was difficult to determine the effect of the vaccine injections, but that the apparent shortening of the duration suggests that they have some value. Ross (14) of Toronto, after what appears to have been a careful study of fifty cases, is much more enthusiastic over the results of this treatment. He used a composite stock vaccine derived from several different cases of erysipelas. He believes that the vaccine of streptococcus erysipelatis exercises a specific and controlling influence on the course of the disease, prevents spreading, lessens severity and hastens recovery. Mental unrest and physical discomfort were rapidly

controlled and pyrexia seemed to subside more quickly than with other treatment. Sequellæ seemed much less common.

It appears possible from the work of Gabritschewsky (15) and other Russian observers that killed streptococci may prove of value in connection with scarlet fever, for prophylactic purposes if not in its treatment. They have used these vaccines to produce immunity to the disease. Following the injections, there was a slight rise in temperature, angina, with an erythema and rash somewhat like that of scarlet fever. These symptoms did not appear in children who had had that disease. In those who had not had it, injections of the vaccines appear to give protection against the contagion, for the time at least. Of course their work requires careful repetition by others. Allen (16), in treating a few cases of scarlet fever with streptococcus vaccines, could not see the slightest good effect. A few cases of streptococcus endocarditis (Barr, 17, Wright, 18) and of puerperal sepsis, with favorable outcome under vaccine therapy, are recorded. Horder, in an excellent article on "Infective Endocarditis," published in the *Quarterly Journal of Medicine* (April 19, 1909, p. 289), finds no promise of success in vaccine therapy. One of his cases previously reported as treated with vaccines with marked success, has since died from a relapse, in spite of vaccine treatment. In the twelve cases treated by this method, there were no recoveries. The general consensus of opinion appears to be that the results to date are not such as to give much hope for the future in these cases.

In using streptococcus vaccines, the autogenous vaccines should be employed whenever possible. Weaver and Tunnicliff (19) have raised the question whether better results may not be obtained by killing the streptococci by some other means than heat. They find that in experiment animals, and evidently in man, streptococci killed by galactose produce much more immunity than those killed by heat.

Gonococcus infections. In these the most satisfactory results have been obtained in gonorrheal arthritis. Cole and Meakins (20), using a stock vaccine, concluded that the vaccine treatment was of distinct value here. They added,

however, what all who have used vaccines in this disease can confirm, that those who expect brilliant results or immediate cures following one or two doses of vaccine will be disappointed. Irons (21) considers that the improvement under vaccine treatment is more marked in subacute and chronic cases than in acute ones. He calls attention to the use of gonorrheal vaccines for diagnostic purposes. The injection of 500M¹ of dead gonococci into a person without gonorrheal infection, he found, produced little or no constitutional disturbance. In gonorrheal arthritis, on the contrary, there was increased articular pain, rise in temperature and general malaise. As this articular pain soon decreases until it is less than before the injection, Mainini (22) suggests this arrest of the pain as of importance in differential diagnosis. Aside from the relief of the pain, he does not think that the vaccines modify the course of the disease.

Acute gonorrheal urethritis in the male appears, as a rule, not to be materially helped by vaccines, although some reports indicate excellent results in these cases (Aronstam, 23). Hollister (24) reports an interesting series of fifty cases of gonorrhea in women between fourteen and twenty years old. These were divided into groups, and in those receiving vaccine therapy, with or without antiseptic treatment, the gross discharge from the cervix, vagina and urinary meatus diminished more quickly than in those treated otherwise.

Numerous cases of gonorrheal vulvo-vaginitis of children, treated by vaccines, have been recorded (Hamilton, 25). Butler and Long, in an earlier report (26) of a series of twelve cases, say that this treatment appears to be more efficient and at the same time scientifically more tenable than the use of local antiseptics. In a later report of twenty-five cases (27), they say that the results are so striking that they have now discarded local treatment and rely wholly on vaccine therapy. Dosage, as used by them, 5 to 50M., sometimes 100M. Stock gonococcus vaccines appear to be fully equal to autogenous vaccines.

¹ M = million, the unit of dosage in vaccine therapy.

Bacillus coli infections. In cases of persistent bacteriuria, Geraghty (28) found vaccine treatment entirely negative. Better results have been obtained by the majority of those who have used the treatment in cystitis and pyelitis due to the colon bacillus, when autogenous vaccines have been employed. McArthur and Hollister (29) have found it of definite value in urinary tract infections. In colon bacillus infections of the kidney and bladder, complicating tuberculosis of these organs, with a long and persisting bacilluria, Martyn (30) reports excellent results from the vaccine treatment. Davis (31), in a very recent article, gives results in several cases of urinary infections due to this bacillus. He employed as an initial dose, 200M. of the killed colon bacilli and increased this until a suitable result was obtained. Such doses produce considerable local and general reaction, with at times irritation of the bladder. In one case where pus and bacilli had been present constantly for over five years, these had entirely disappeared after four months of treatment. Two precautions seem necessary here. Autogenous vaccines must be employed, because the different strains of the colon bacillus differ very much from each other. Secondly, the urine, if acid, must be rendered alkaline. It has been shown that phagocytosis of bacteria is much more active in a slightly alkaline medium than in one which is acid. As the destruction of the bacteria is here due chiefly to phagocytic action, this is an important precaution in these cases.

Wright (32) has used the bacillus coli vaccines in cholecystitis, one case of which had continued for sixteen years; also in cholangitis. Other localized inflammations, due to this bacillus, periappendicular abscesses, endometritis, etc., have been reported as successfully treated by vaccines.

Typhoid infections. Richardson (33) has been using for years a modified vaccine in typhoid fever (Vaughn's non-toxic residue of the typhoid bacillus). He has treated forty cases with this with two relapses (5 per cent.) as compared with one hundred and sixty-three cases, treated in the same hospital (Massachusetts General) by the routine method, with

thirty-five relapses (21.4 per cent.). Watters and Eaton (34) also report, from the Massachusetts Homeopathic Hospital, thirty cases with two deaths. These were not selected cases, but all taken as they came. They used a stock vaccine which had been killed by heating to 60° C. for twenty minutes. Many of the charts show a decided fall in temperature after vaccine treatment was begun. They used as an initial dose 15M. to 50M. killed typhoid bacilli, and this amount was not increased. In many cases, only one or two injections were given; when multiple injections were given, they were at intervals of four days. While the cases reported are too few to warrant any conclusions as to the value of the treatment, the results are at least of sufficient interest to justify a further trial of the method, particularly as no harm appears to follow the use of the typhoid vaccines.

Numerous other infections have come under vaccine therapy, but only a few can be referred to here, and that very briefly. A meningococcus vaccine has been employed in cases of epidemic cerebro-spinal meningitis, but Flexner's antimeningococcus serum has rendered the further use of this unnecessary. The value of a pneumococcus vaccine in acute pneumonia is as yet problematical. When resolution is delayed, such a vaccine seems to be of distinct value in clearing up the lung. Subacute and chronic endocarditis is frequently due to a pneumococcus which, as shown by Rosenow (35), is of exceedingly slight virulence but, when introduced in enormous doses intravenously into rabbits, will produce an endocarditis. The disease might appear to be an ideal one for vaccine therapy. But Rosenow has shown that in some way these almost avirulent pneumococci protect themselves in the blood and on the endocardium. There is frequently an abundance of opsonin in the blood and the bacteria may be ingested by the leucocytes of the host, but the latter are unable to destroy the pneumococci thus ingested. Vaccine therapy seems at best to give only a slight temporary improvement, nothing more.

At least two cases of actinomycosis successfully treated have been reported (Wynn, 36, Whittier, 37). Persson (38)

has just published the apparent cure of a case of favus of twenty-three years' standing by the use of an autogenous vaccine. In the acute and chronic catarrhs of the air passages, a considerable variety of bacteria has been isolated and promising results have followed the use of appropriate vaccines.

The above must suffice to show the general scope of vaccine therapy and its wide application in bacterial infections. Mention only will be made of that most important part of the subject included under the tuberculin treatment of tuberculosis. No attempt to discuss this can be undertaken here.

It should be appreciated that for the successful employment of vaccine therapy, diagnoses must be more carefully made than has frequently been done in the past. Not merely the pathological condition but its causative bacterium must be determined, and this will require more frequent demands upon laboratory workers than in the past. In gonococcus infections and a considerable per cent. of staphylococcus infections, stock vaccines may well be used. But in most of the other infections autogenous vaccines should be employed. This again requires the help of the trained laboratory worker. The material from which these vaccines are to be prepared must reach the bacteriologist soon after being taken. Otherwise the less resistant bacteria may die out and the culture fail to show all the varieties present. In mixed infections, it is often essential to use a vaccine made from each kind of organism present, in order to produce the desired immunity.

The number of dead bacteria which should be injected at each dose varies much with the bacterium and with the extent and severity of the process. The following may be given as indicating the size of the dose in the ordinary case:

Staphylococcus vaccine,	100 M. to 1,000 M.
Streptococcus vaccine,	10 M. to 50 M.
Gonococcus vaccine,	10 M. to 100 M.
Pneumococcus vaccine,	20 M. to 100 M.
Bacillus coli vaccine,	20 M. to 100 M.
Typhoid vaccine,	10 M. to 250 M.
Bacillus mucosus vaccine,	40 M. to 400 M.

Many begin with the smaller quantities and increase the dose in subsequent injections. I find that in some chronic cases the doses above given have to be exceeded to produce the proper response. For example, it may be necessary to use staphylococcus vaccine in a dose of 3,000M. to 5,000M. in chronic furunculosis.

Following the injection of a good-sized dose of vaccine, there may be for some hours general malaise, with increased severity in the symptoms of the disease. If this so-called "negative phase" is marked or too prolonged, it indicates that the dose used was too large.

The usual interval between injections varies from four to ten days, though in acute, generalized processes, where small quantities are given, the injections may be made daily, or every second day.

An objection to the employment of bacterial vaccines is found in the method of administering them by subcutaneous injection. Latham (39) has obtained results which, if confirmed, may lead to their being used orally, with results equally as good as by subcutaneous injection.

In interpreting the reported results of vaccine therapy, it must be borne in mind that investigators are usually enthusiasts, otherwise they would probably not be investigators. Also, that entirely conscientious men prefer to report their successes in treatment rather than their failures. But, after making all due allowances, it appears that vaccine therapy produces effects in a class of cases heretofore particularly resistant to treatment. To expect striking results in every case is, of course, to be disappointed. But the use of appropriate vaccines, in properly selected cases, will, I am convinced from a limited personal experience, encourage anyone to their continued use.

As already noted, but little success had yet been reported with this treatment in general infections, except, perhaps, typhoid fever. It seems probable that the future may yet show vaccines to be of value in these cases also. Theoretical considerations appear to me to justify the belief that this may be

so. Recovery, when it occurs in these cases, is an indication that the body has been able to respond to the infection and destroy the offending organisms or their toxic products. In these cases, if the diagnosis can be made early enough and vaccine therapy at once begun, it appears consistent to suppose that the immunizing response will at least be more rapid and recovery quicker, and that the per cent. of recoveries may be considerably greater than at present.

REFERENCES.

- (1) Wright. *Lancet*, June 1, 1901, p. 1534.
- (2) Leishman. *Brit. Med. Jour.*, January 11, 1902, p. 73.
- (3) Wright. Numerous papers in *The Practitioner*, *Lancet*, *Brit. Med. Jour.*, *Proceedings Royal Soc.*, and *Jour. A. M. A.*, from 1902 on.
- (4) Wolfsohn. *Berlin. k. Woch.*, No. 49, December 7, 1908, p. 2184.
- (5) Hort. *Brit. Med. Jour.*, February 13, 1909, p. 400.
- (6) Wells. *The Practitioner*, Vol. XXVII, 1908, p. 635.
- (7) Quoted by Cunningham in an excellent article on "Present Opinion as to the Value of Opsonic Index Determinations," *Southern Cali. Practitioner*, December, 1908.
- (8) Wright. *Lancet*, August 17, 1907, p. 423.
- (9) Hartwell and Lee. *Bost. Med. and Surg. Jour.*, October 17, 1907, p. 523.
- (10) Whitfield. *Jour. Cutaneous Diseases*, December, 1907, p. 529.
- (11) Goadby. *Brit. Med. Jour.*, September 9, 1905, p. 562; August 22, 1908, p. 477.
- (12) Weaver and Broughton. *Jour. Infectious Diseases*, December 18, 1908, p. 608.
- (13) Schorer. *Am. Jour. Med. Sci.*, November, 1907, p. 728.
- (14) Ross. *Med. Record*, December 12, 1908, p. 1031; *Jour. A. M. A.*, November 6, 1909, p. 747.
- (15) Gabritschewsky. *Centrolb. f. Bakt., Abt. Orig.*, Bd. xli, Heft. 7, p. 719; *Berlin k. Woch.*, No. 18, May 6, 1907, p. 556.
- (16) Allen. "Vaccine Therapy and Opsonic Treatment," second edition, p. 166.
- (17) Barr. *Lancet*, February 23, 1907, p. 499.
- (18) Wright. *Lancet*, August 24, 1907, p. 499.
- (19) Weaver and Tunnicliff. *Jour. Infectious Diseases*, December 18, 1908, p. 585.
- (20) Cole and Meakins. *Johns Hopkins Hosp. Bull.*, June-July, 1907, p. 223.
- (21) Irons. *Jour. Infectious Diseases*, June 4, 1908, p. 279.

- (22) Mainini. *Presse Médicale*, January 16, 1909; Abstract, *Jour. A. M. A.*, February 27, 1909, p. 739.
- (23) Aronstam. *Jour. A. M. A.*, October 24, 1908, p. 1419.
- (24) Hollister. *Surgery, Gyn. and Obstetrics*, December, 1908, p. 629.
- (25) Hamilton. *Jour. Infectious Diseases*, March 30, 1908, p. 133. Has good bibliography.
- (26) Butler and Long. *Jour. A. M. A.*, March 7, 1908, p. 744.
- (27) Butler and Long. *Jour. A. M. A.*, October 17, 1908, p. 1301.
- (28) Geraghty. *Johns Hopkins Hosp. Bull.*, January, 1909, p. 12.
- (29) McArthur and Hollister. *Surgery, Gyn. and Obstetrics*, October 19, 1907, p. 373.
- (30) Martyn. *Southern Cali. Practitioner*, November, 1908, p. 508.
- (31) Davis. *Jour. Infectious Diseases*, April 1, 1909, p. 224.
- (32) Quoted by Allen. "Vaccine Therapy and Opsonic Treatment," second edition, p. 193.
- (33) Richardson. *Bost. Med. and Surg. Jour.*, August 22, 1907, p. 449; January 2, 1909, p. 12.
- (34) Watters and Eaton. *Med. Record*, January 16, 1909, p. 93; *Boston Med. and Surg. Jour.*, April 22, 1909, p. 508.
- (35) Rosenow. *Jour. Infectious Diseases*, April 1, 1909, p. 245.
- (36) Wynn. *Brit. Med. Jour.*, March 7, 1908, p. 554.
- (37) Whittier. Reported at meeting of the American Assn. of Path. and Bact., April 10, 1909.
- (38) Persson. *Jour. A. M. A.*, May 22, 1909, p. 1663.
- (39) Latham. *Proc. Roy. Soc. of Medicine*, 1907-08, 12, p. 195.
- (40) Leary and Mendalia. "Bacterial Opsonins and Vaccines." From the Tufts College Laboratory of Pathology, 1907. This gives many good suggestions and a large number of cases.

DISCUSSION.

DR. GEORGE BLUMER (New Haven): It seems to me that in using vaccines in generalized infections and in the more localized forms, we are dealing with two rather different propositions. It is easy to see that when the infection is localized, and possibly walled off, to a certain extent, by inflammatory products, so that the cells and fluids of the body cannot get at the seat of infection very well, the stimulation brought about by vaccines would theoretically be of great benefit. As a matter of fact, the most striking results have been achieved in chronic infections and in infections that were more or less localized, or shut off by inflammation. On the other hand, in a case of general infection, one would rather expect that, at its height, one would not get marked results from vaccine therapy; because, with a

general infection, the body in general is invaded by the micro-organism causing the disease, and one would think that one would hardly be likely to help matters by introducing further bacteria. If the body is going to react in a general infection to that particular organism, it should have reacted already to the ones in the circulation. It does seem to me, however, that there is some possibility of their being of some value in general infections, if they can be introduced early enough. I think that this is going to be the point in the vaccine treatment of sepsis—a matter of making the diagnosis early and introducing the bacteria while there are few organisms in the circulation, thus stimulating the body to such activity as to overwhelm the organisms and check the infection.

There is not much else to be said in addition to what Dr. Bartlett has mentioned. My personal experience with the use of the vaccines has not been large. There are, however, two or three points that I should like to touch upon.

As to the value of the opsonic index, the majority of those who have paid attention to it have concluded that it is not a practical procedure that can be carried out by the ordinary practitioner; indeed, it can hardly be carried out in an ordinary laboratory. It requires individuals with special training; it takes so long and is so uncertain. Therefore, for practical purposes, the use of the opsonic index is going out. The question is whether any other method of estimating the opsonic index except that furnished by the general condition of the patient can be substituted for it. Those who have given up using it have based the time of the dose upon the condition of the patient—which, of course, has been followed by good results in some cases; but it is a question whether there is not some other way to get at the opsonic index. The fever reaction does not help us, because we do not give the immense doses that were given at first with tuberculin. We no longer believe the febrile reaction necessary.

DR. ARTHUR H. GRISWOLD (Hartford): We have tried this opsonic work at the Hartford Hospital during the last year, but we have given up taking the index there. We made some experiments to see whether there was any variation in the results obtained, and in a single slide two men got a variation of .8 in the index. We then tried some other slides, and found the variation to be almost one; so we decided that if in one slide we could get so much variation, the test was not reliable.

Another point in regard to using autogenous vaccine that is important, particularly in staphylococcic infection, is the remarkable lessening of the pain of carbuncles and furuncles. If you use a stock-culture, the pain is not nearly so likely to let up. Therefore, it is important to use the autogenous vaccine.

DR. CHARLES J. BARTLETT (New Haven): I have only a word to add. I fully agree with what Dr. Blumer has said about the uselessness of vaccines at the height of an acute generalized infection; but it seems to me that, if used early in cases in which the diagnosis is correct, they may be of value. I know of results from other workers, showing that when used in large doses and very early in the disease, it is a very valuable method of treatment.

As to the quickness with which autogenous vaccines may be obtained, they can be prepared within twenty-four hours, if the infecting organisms are in pure culture and grow rapidly. If, however, the growth is a mixed one and the pure culture must be obtained from the mixture, it takes longer.

Venesection and Dermatology.

THOMAS M. BULL, NAUGATUCK, CONN.

Venesection as a remedial measure is old, very old. Had I the time and opportunity to wade through the ancient Chaldean, Egyptian, Chinese and mediæval medical literature, I could probably find many allusions to it as a measure and might possibly find some notice of its use in dermatology, a thing I have been unable to do so far. But like every other measure which has endured for thousands of years, it has had its ups and downs and has been more fashionable at times than at others, and it seems that the last few years has been the time when the pendulum has been near to the end of its swing in the disuse of this remedy.

As a therapeutic measure it would seem on the face of it to be of importance. A measure whereby you can make the strongest man as weak as an infant and in a few minutes' time can reduce the blood pressure to the vanishing point, and inasmuch as the blood volume is soon made up again, you can alter the relative proportion of the blood ingredients. A measure which can infallibly do all of these things must of necessity be a powerful one. Whether its power can be so ordered as to be of value in therapeutics is another question. As a therapeutic measure I have used venesection in general medicine for many years, usually with good success, and have seen the most brilliant results from its use in certain cases. You must pick the patients to use the measure on, for if used in improper cases it is as capable of doing harm as good, but used where the indications point to it, I believe it is one of the most valuable remedies we possess.

My attention was attracted to its value in Dermatology in a rather unusual way. Several years ago I had a young lady referred to me suffering from psoriasis. It proved to be one of those chronic cases, as indeed most cases of psoriasis are.

This patient, a florid, full-blooded girl, would become very bad with the disease, then rapidly improve, and during the several years that I treated her had many of these alternations. I was much interested in finding the cause of the exacerbations and after considerable questioning drew from her the following rather remarkable history. Although unmarried, she had an enterprising lover who had succeeded in making her pregnant eight times. He would then take her to an accommodating irregular practitioner who would relieve her of her burden by inserting the sound, which was followed by a great hemorrhage. After these hemorrhages the psoriasis would disappear, only to come back again in a few months. About this time she was married and moved away, so I have not been able to trace her subsequent history.

The first case where I used the remedy in dermatology was one of universal eczema in an ironmaster, a stout, red-faced man of forty-five, with high blood tension and great executive ability. I had treated him daily for a month and no improvement—rather the contrary. Almost in despair, I bled him about twelve ounces. The itching and subjective symptoms stopped at once and in one week he was apparently well.

The next instance was a case of nearly universal eczema in a woman of about forty-seven who had recently passed the menopause. After several weeks of treatment, not having improved, and as she had a high blood tension (as I frequently find in patients of this age), I bled her. Her immediate relief and rapid recovery were very gratifying. Three years later, although removed from town, she returned to have the operation done again, as it had come back a little. The second time the result was the same.

The next case was one of erythema iris, who had been confined to the bed and steadily growing worse for several weeks. I had exhausted my own therapeutics and also those of a celebrated New York specialist. Not a particle of improvement—rather the contrary. She was covered from head to foot with the enlarging rings, many of which suppurated. Tem-

perature 103, pulse 120, and was really in the dying class. As a last resort I bled her. Not one vesicle came out after it and her recovery was immediate and complete.

The next case was one of the same disease, the patient a seventeen-year-old boy. He had been laid up for several weeks at a time with great crops of vesicles, and incidentally was once quarantined a month for smallpox while suffering from this same disease. In this case, as the blood pressure was high, I tried no other measure but bled him at once. No more vesicles came out and he seemed entirely well in a few days.

A recent case in which I have used the measure is one of a domestic who had been utterly unable to work for three years as a result of an inflammation of the roots of the nails so severe that the nails had nearly all come off. In the course of two years I used every means I knew of, including X-rays, violet rays, leucodescent light, diet, hygiene, and every drug I thought could be of use. In one week after a ten-ounce venesection the hands were better than for three years and indeed seemed entirely well.

Were I to undertake to describe each case it would take too long, and inasmuch as they are not yet numerous enough to classify, and might not be for several years, I ask your permission to indulge in a few therapeutic speculations as to the cases of probable utility of this measure.

First—Whenever there is an acute inflamed condition of the skin in a sthenic subject. Some cases of acute or inflammatory eczema, or erythema, or dermatitis, or inflammatory psoriasis, especially when occurring in a sthenic subject, I believe can be more certainly and easily benefited in this way than any other. I have had several cases in this category, with immediate relief in all but one.

Second—When in any acute or chronic case of skin disease the blood pressure is continuously high, the pressure may be at once reduced by the abstraction of a few ounces of blood, and often the greatest improvement will at once follow. This high blood pressure is a concomitant of our present high tension method of life and a neglected method of combating it may

certainly be found in venesection. Not but what there are plenty of other methods, but none so powerful and sure as venesection.

Third—To alter the composition or proportion of ingredients in the blood. It seems as if we were entering on a new era of medicine in the present investigation of the effect of treatment and the various problems of immunity, heredity, etc., in relation to the blood. It would seem that there would be a field here for a measure which can so powerfully alter the character of the blood in so short a time. Just what its indications or limitations will be I confess I am unable to point out, but merely drop this as a suggestion as to what may be expected of the measure.

Fourth—Pruritus, especially when occurring with a high tension and the patient becoming almost hysterical and even maniacal with the intensity of the symptom, often prompt relief can be expected of this measure.

Fifth—After the menopause. I have used the measure in several cases for the relief of dermatological symptoms. At this time of life, patients who have been in the habit of losing several ounces of blood monthly for thirty years, are very apt to develop symptoms on the cessation of the blood flow, especially if they keep on eating the same amount as during adolescence and active life.

Sixth—To reinforce suggestion. I hesitate to mention venesection in such a condition, but I am sure that all of us are often driven to use every method possible for the cure of intractable cases. The efficiency of suggestion as a therapeutic measure is undoubted. Witness the success of the Eddyites, Doweyites, Emmanuelites, Homeopaths, Osteopaths, patent medicine, etc., whose methods are simply modified suggestion. The sealing of a suggestion by a blood sacrifice has been thoroughly understood by our theological friends for the last many thousand years, and while I would hardly recommend it for this purpose alone, it can do no harm to use all the suggestion possible in every case where the measure is used; and I believe it the privilege and duty of every physician to

assimilate every idea for the cure of disease as rapidly as possible, without regard for its source or former condition.

Seventh—With patients who will not lessen their pace nor use other measures. We all meet these patients, and unfortunately some of them are our best citizens, men who by their own efforts have risen to the highest places, to the command of armies, either industrial or in the field, to great wealth or eminent position, and by the very act of doing so have acquired the high tension character; men whose health and digestion have been excellent and who have been accustomed to do exactly as they wished. "Diet be damned," said one of this kind once when it was proposed that his freedom from dermatological complications and even his continuance on this mundane sphere were contingent on his temperance in eating and drinking. Another class in this category are those who promise and do not perform. Both of these, and especially the first, will often consent to venesection and so the same end may be attained.

I suppose the proper treatment of these cases would be to dismiss them with costs, but that means simply that they would be removed to another court outside of our jurisdiction, with an irregular or patent medicine man presiding.

Finally, the measure may be used as a last resort. When we had done all we had ever heard of, perhaps exhausting the therapeutics of the text-books, tried and failed with diet, hygiene, etc., then as a last resort this measure may be thought of. Some of my most brilliant results have been in cases of this class.

But sometimes one patient will combine many or every indication I have mentioned. That is, one with acute inflammatory disease, whose blood pressure is high, who has pruritis, who will not diet nor use hygiene, may need venesection as a last resort to alter the character of the blood and to enforce suggestion, but it is not usually considered necessary to wait for every symptom or indication to make a diagnosis or recommend a therapeutic measure.

The technique of venesection may be obtained from any text-book of surgery. I generally use cocaine, because most

patients are grateful for all the pain you save them, and if you don't happen to strike the vein the first time, you can try again, while few patients will consent to very many cuts without it. Besides, if you assure the patient that it will hurt no more than a hypodermic, you may get the consent to the operation where otherwise you could not.

Gentlemen, there is no one recognizes better than I the imperfection in this paper from a scientific or literary standpoint, but it seemed to me that the subject should be brought before the profession and knowing no better way I have chosen this one. If you can indorse any of the propositions I should be pleased to have you, and if you have experiences or convictions that disagree from anything here stated, please don't let any regard for my feelings or opinions prevent you from relating them.

DISCUSSION.

DR. MARK S. BRADLEY (Hartford): I was very much interested in the title of Dr. Bull's paper. It was unique to me. I have never practised venesection in dermatological cases. I turned to dermatological literature and endeavored to find some comment on this method of treatment, but without avail. I could find nothing in regard to the subject. Even Cullen's Practice, one of the first practices of medicine published in this country, printed in New York in 1793, contained no reference to it. The use of phlebotomy for a number of other disorders was mentioned, but the book contained no reference to this form of treatment for skin diseases.

Dr. Bull's paper is unique in the fact that it reports his own personal experience with this form of treatment, and he has demonstrated the success of its use in his own practice. If we pause, however, for a moment, to review the history of medical literature in the past hundred years, we are surprised to see that the lancet, which our medical forefathers wielded with no uncertain hand, has been so completely replaced by other therapeutic measures that its use is merely a tradition in the hands of the large majority of medical practitioners to-day. Beyond a doubt, our medical forefathers accomplished some good with venesection, and probably the disrepute of the treatment is due to the poor selection of cases. There is food for thought, and perhaps some cause for discussion, in Dr. Bull's paper; but I wish to thank him sincerely for bringing this neglected form of treatment to our notice.

DR. RALPH A. McDONNELL (New Haven): It is with considerable diffidence that anyone ought to approach a subject of this kind, so new, with no literature to bear out anything that is said and nothing to contradict any authority cited; yet the propositions laid down seem open to discussion. I do not see how venesection could do good in dermatology, except in two ways—for two reasons: because the skin disease in question is caused by high blood pressure, or because it is caused by something circulating in the blood.

Dr. Bull mentioned psoriasis and chronic eczema and pruritus. In psoriasis, there is usually high tension of the arteries, but not in all cases. The disease is not commonly better during the menstrual period; and in many cases in which there is low tension, the psoriasis is exceedingly bad. I do not think that anyone has said that psoriasis is caused by high tension. As to something circulating in the blood, no one has been able to discover in that fluid a cause of psoriasis.

I think that the relief of high arterial tension might be experienced by bleeding, but a specific effect on psoriasis could hardly be expected. It is the same with eczema and pruritus. The treatment of the skin ought to be undertaken with due consideration of the condition of the body as a whole. We must treat the patient, as well as the disease. If high arterial tension is one of the symptoms, it ought to be lessened in some way—and phlebotomy is a good way; but so far as its being a specific in skin diseases, I cannot see any reason for believing it to be so. Our forefathers, otherwise, would have written something on this point. They could not treat psoriasis with phlebotomy, or anything else, as well as we can.

In regard to things circulating in the blood (ptomaine poisoning, etc.), phlebotomy might be expected to do good, because it would get rid of the cause of the disease; but for a reason, I have searched in vain. I congratulate Dr. Bull, and I do not for a minute think that he has exaggerated his results. I shall be glad to try it in suitable cases, which I have not done yet.

DR. WALTER L. BARBER (Waterbury⁹): I should like to ask Dr. Bull about the quantity of blood removed in his high-tension cases?

DR. THOMAS M. BULL (Naugatuck): From eight to twelve ounces, and sometimes sixteen.

I should like to say that I do not for one minute think of venesection as a specific for any disease whatever, but as a procedure to be used with judgment in any case of high tension. We certainly can reduce tension at once in this way better than in any other. In some cases in which we are driven to the last ditch, we find immediate and great benefit; and the patient may get entirely well. If you try it a few times, you will realize its value better than in any other way.

Localization of Lesions of the Genito-Urinary Tract.

FRANK H. COOPS, M.D., BRIDGEPORT, CONN.

I need not dwell upon the necessity of having a fixed and methodical plan of procedure in arriving at an accurate diagnosis. This is true in all departments of medicine and especially true is it in lesions of the genito-urinary tract.

Practitioners of the generation immediately preceding our own plodded along making their diagnoses by the various clinical methods then in vogue, viz.:

(1) Subjective symptoms obtained by questioning the patient.

(2) Information obtained by the physical, chemical and microscopical examination of the secretions and excretions of the genito-urinary tract.

(3) Objective signs and symptoms elicited by inspection, palpation and percussion, supplemented by the use of catheters, sounds and stone-searchers.

The perfection of these methods by the present day urologists and the invention and use of such instruments as the urethroscope, anterior and posterior, the cystoscope with all of its modern attachments, the different urine segregators of Harris, Downes and Luys, and the X-ray photographs, have so revolutionized the whole work as to make it perhaps the most exact department in the wide realm of the medical sciences.

The subject is a large one, so that I shall have to content myself with giving the merest outlines. The significance of any one symptom must be interpreted in connection with all the other signs and symptoms elicited and whatever additional light can be brought to bear upon the subject.

In getting a history of your case inquire first as to frequency of urination. This frequency may be due in the first place to increased quantity of urine secreted; *e.g.*, certain constitutional disorders like diabetes mellitus or insipidus, chronic interstitial nephritis; or it may be due to certain functional disorders like hysteria, or the patient may be ingesting more fluids than normal. Again, frequency may be due to increased irritability of the urinary tract. All microbic invasions or traumatisms associated with inflammatory disturbances of the genito-urinary tract or its adnexa increase irritability. The greater the disturbance and the more closely located the infection is to the reflex center in the posterior urethra, the greater the frequency; *e.g.*, in acute posterior gonorrheal urethritis, gonorrheal or tuberculous prostatitis with associated involvement of the posterior urethra, cystitis (especially at the neck of the bladder), whether due to gonorrheal or tuberculous infection, new growths, traumatisms produced by the faulty introduction of sounds, etc., chemical irritants such as strong caustic irrigating fluids, or foreign bodies such as calculi in the bladder itself.

In partial retention, the bladder getting rid of only a portion of its contents at a time, it is natural that frequency will result. This condition is produced by obstructions in the urethra; *e.g.*, strictures, gonorrheal or traumatic, new growths, encysted foreign bodies, or by hypertrophy of the prostate, fibrous contraction of the neck of the bladder, intravesical or extravesical tumors. Sooner or later an atonic condition of the bladder results and a little later the decomposition of the residual urine will produce a cystitis which will increase the desire to urinate.

In complete retention, whether due to complete blocking up of the urinary outlet from one or other of the above-mentioned causes, or whether due to paralysis of the bladder from some reflex source or central nervous lesion, there is a constant desire to urinate after the bladder is filled. The intravesical pressure in these cases may become so great as to overcome the contraction of the sphincter vesicæ, allowing the urine to

come away drop by drop—the so-called “incontinence of retention.”

A second symptom that has to be inquired into is the existence of pain. All of the conditions mentioned above that produce frequency through increased irritability will also produce pain of greater or less degree. The time of the appearance of pain is of diagnostic value. In urethritis, the pain is increased by the passage of urine over the inflamed mucous membrane. In cystitis, the presence of urine in the bladder increases the pain; hence is relieved when the bladder is empty. If the bladder cannot be completely emptied in cases of cystitis with retention, the pain, although partly relieved, still continues after the urinary act is finished. Vesical calculi produces most pain in an empty bladder.

The location of the pain ought also to be inquired into. For instance, in renal colic the pain occurs in the corresponding side over the region of the kidney and radiates along the course of the urether down into the groin. In vesical calculi the pain occurs at the completion of the urinary act and is most pronounced at the end of the penis. In prostatic affections there is a dull throbbing pain in the perineum and rectum which is intensified during urination and defecation. In stricture the pain is at the site of the stricture and is intensified by the passage of urine over it, by the introductions of sounds, etc. In vesical calculi and all inflammatory diseases of the genito-urinary tract, exercise increases the frequency and pain of urination.

In the third place the change in the character of the stream must be investigated. It is pathognomonic of strictures of the urethra to have a diminution in the size of the stream—the diminution being in direct ratio to the closeness of the stricture. A forked or spattered stream is also characteristic of stricture. A small stream that is increased in force by voluntary effort on the part of the patient is due to stricture. In hypertrophy of the middle lobe of the prostate, increased efforts at urination by forcing the middle lobe to act as a ball-valve will diminish the size of the stream. Dribbling at

the end of urination is a sign of obstruction with dilatation above the obstruction, allowing a greater or less amount of the fluid to collect. This occurs in stricture of the urethra, also in enlarged prostate with an atonic or dilated bladder. Sudden arrest of the urinary stream before the act of urination is completed, often requiring a change of position of the body to again start it, is pathognomonic of a small movable vesical calculus. A normal sized intermittent stream of little force means vesical atony due to some central nervous lesion.

After a complete history of the case has been obtained and certain conclusions as to the nature of the trouble have been arrived at, we proceed to further verify these conclusions by investigating the urine, or any discharge that may appear at or be expressed from the meatus.

A turbid urine should be first investigated as to the cause of the turbidity. If the urine clears up on heating the turbidity is due to urates. If due to phosphates it will clear up on the addition of nitric or acetic acid. The presence of bacteria and prostatic elements is determined by microscopical examination. As the presence of pus and blood in the urine or discharges from the genito-urinary tract is of such valuable diagnostic importance, we shall be pardoned for considering it in some detail.

If we have a discharge of pus from the urinary meatus the probability is that it is of urethral origin. Collect some of the discharge upon a glass slide, fix with heat and stain with methylene blue to determine the infecting organism. If we are in doubt as to whether the cocci present are gonococci use Gram's differential stain. Seminal or prostatic fluid are also differentiated from pus by the microscope. Next instruct the patient to pass his urine in two glasses. If the first urine is cloudy and the second clear, there is an anterior urethritis, gonorrheal or simple according to the infecting organism found in the discharge. If both urines are cloudy, the first more than the second, there is present an anterior and posterior urethritis. If we have reason to suspect additional involvement of the bladder, use the three-glass test. In this case the

first urine is cloudy, the second less cloudy, the third, containing the sediment of secretion from the bladder, is very cloudy.

In acute urethritis, or urethrocystitis with abundant discharge, these tests are sufficient to enable us to make a diagnosis. In the chronic cases, however, *e.g.*, chronic posterior urethritis, where the discharge from the posterior urethra is so scanty that it is all washed out in the first urine, and not enough accumulates in the posterior urethra to flow back in the bladder, the first urine will be cloudy or contain shreds, whereas the second will be clear. To obviate such errors of diagnosis it will be necessary to resort to one of the various irrigation tests. The technique of Kollman's five-glass irrigation test is as follows: The anterior urethra is washed out with a boric-acid solution, using a soft catheter or the Janet irrigator, being careful not to allow any of the fluid to pass beyond the cut-off muscle. This is continued until the fluid comes away clear, and the washings are collected in two glasses. The patient then urinates into three glasses. The test is interpreted as follows: Glass one contains the washings—pus, shreds, etc.—from the anterior urethra; glass two, the "control," contains the clear irrigating fluid; glass three, the pus from the posterior urethra; glass four, that from the bladder; glass five, the last of the bladder urine plus the pus and detritus squeezed out from the prostatic ducts by the muscular contraction of the neck of the bladder in the effort to expel the last drops of urine. If, before the last urine is passed, the prostate and vesicles be massaged per rectum, the amount of pus and inflammatory exudate that these organs contain can be more accurately determined. This test may be still further modified by passing a soft catheter into the bladder in order to get the contents for glass four, in this way getting bladder urine direct and uncontaminated from other sources.

The proper interpretation of urethral shreds as they appear in the urine is a matter of considerable diagnostic importance. In an acute urethritis we find small granular flakes, made up of epithelial and pus cells, slowly sinking to the bottom of the glass. A little later in the disease the long threads from the anterior

urethra appear. They are composed of pus, principally, and rapidly sink to the bottom. The so-called tadpole shreds arise from ulcerated patches along the urethra, around the opening of infected mucous follicles. Long, irregular, translucent shreds suspended in the urine are composed principally of mucus, secreted from the urethral glands in the later stages of the disease after the pus has disappeared. In the last glass, comma-shaped bodies, composed principally of pus cells, come principally from the inflamed prostatic ducts. In non-inflammatory conditions of the prostate and vesicles, the expressed secretions have a white, fleecy, cottony appearance, which float on the surface of the urine. In inflammatory conditions they are grayish, stringy masses which sink to the bottom.

As a general rule, pus originating from the bladder is differentiated from that coming from the kidneys as follows: The bladder is irrigated with a boric-acid solution until the fluid comes away clear. When the patient next urinates the urine will only be slightly cloudy if pus comes from the bladder; as cloudy as before if it comes from the kidneys. The withdrawal of urine by catheterization direct from these organs will of course render the diagnosis more accurate. Bladder pus (especially in chronic cystitis) is found in alkaline urine, kidney pus in acid urine. Bladder pus settles to the bottom of the receptacle as a more or less light and fluffy mass; kidney pus forms a dense and heavy deposit.

Inasmuch as the epithelial cells lining the different portions of the genito-urinary tract are very similar in appearance, Casper affirms that their recognition under the microscope is well-nigh impossible except in the rarest cases. As a general rule, bladder cells are of the large, flat, irregular-shaped variety. Smaller round cells (a little larger than leucocytes) come from the pelvis of the kidney.

Pus originating from the bladder denotes a cystitis. The exciting cause of cystitis is microbic invasion. The principal organisms that produce this condition are, in order of frequency, colon bacilli, staphylococci, streptococci, gonococci and bacilli of tuberculosis. The predisposing causes are:

- (1) Retention of urine from obstructions of the bladder.
- (2) Traumatisms from introduction of instruments or other foreign bodies, or from the passage of calculi.
- (3) Chemical irritants absorbed from the alimentary canal, or introduced through the urethra as irrigating fluids.

Having eliminated the urethra and bladder as the source of the pus, we conclude that it comes from either the ureters or kidneys. The so-called pus kidney may be:

(1) A pyelitis in which the kidney pelvis alone is the seat of the trouble. The infecting organisms gain entrance (a) Through the blood, as in pyæmia, septicæmia, typhoid, etc.; (b) Ascending infections from the bladder, especially following cases of retention in old prostatics—quite frequently we have an extension of a gonorrheal cystitis; (c) The organisms may wander to the kidney from neighboring organs; *e.g.*, in colon bacillus infections of the liver, intestines, etc.

(2) A pyelonephritis in which the infection also involves the structure of the kidney proper. When the whole organ is more or less dilated it is called a pyonephrosis.

(3) A suppurating nephritis with multiple pus foci which, if they become confluent, produce

(4) A kidney abscess.

(5) Renal calculi, especially in later stages, will develop a pyelitis which, if unrelieved, will go on to the production of a pyelonephritis, pyonephrosis, etc.

(6) Tuberculosis, generally unilateral at first, is invariably associated with a renal pyuria.

The passage of pure blood from the meatus, or the presence of blood in the urine is a valuable diagnostic symptom in numerous affections of the genito-urinary tract. Free blood coming from the meatus, first urine bloody, second clear, denotes affection of the urethra either due to some acute infection, *e.g.*, gonorrhea, or to traumatism from the faulty introduction of sounds, etc., or to the passage of calculi from the bladder. By the three-glass test, if glasses one and three are more bloody than two, and especially if there is terminal

hæmaturia, the blood probably come from the prostate. If the three glasses are equally bloody, with terminal hæmaturia and amount of blood is increased by exertion, we probably have a vesical calculus. An abundant vesical hemorrhage not influenced by exercise, easily provoked by instrumentation, denotes vesical tumor. A slight, intermittent hæmaturia associated with pyuria, not influenced by rest, points to vesical tuberculosis.

After eliminating the lower genito-urinary tract as the source of hemorrhage, an intermittent hemorrhage from the kidney, increased by exercise, is probably due to calculus. A spontaneous, intermittent hemorrhage, variable in quantity, not influenced by rest, is due to renal tuberculosis. A spontaneous, abundant hemorrhage, not influenced by rest, comes from a renal tumor. A continuous hæmaturia in an albuminous scanty urine, in the course of one of the acute infectious diseases, denotes acute nephritis.

Physical examination of the several genito-urinary regions by inspection, palpation and percussion, supplemented by the use of instruments, gives us perhaps the most valuable information and serves to clinch our diagnosis.

Inspect meatus as to size, presence or absence of discharge, note presence or absence of phimosis or paraphimosis, balanitis, etc. Palpate the urethra externally for the existence of spots of induration along its course, denoting the involvement of the mucous glands. Periurethral abscesses, false passages and extravasation of urine are made out by inspection and palpation. Lymphangitis of the dorsum penis, adenitis of the inguinal glands should be noted.

Tumors and swellings of the scrotum and its contents can be made out by inspection. By palpation we can make out whether the enlargement is due to some affection of the scrotal walls, *e.g.*, œdema; by palpation, percussion and inspection, the existence of a hydrocele; by palpation, affections of the epididymis, whether gonorrheal or tuberculous; also syphilitic affections, or new growths of the testicle.

By rectal examination, a symmetrically enlarged swollen prostate, hot and tender, with enlargement of seminal vesicles

means acute prostatitis. Areas of fluctuation may be made out in abscess of the prostate. In chronic prostatitis the prostate is not so swollen and sensitive, is generally harder, with evidences of infiltration in the periprostatic structures. In tuberculous prostatitis, rectal examination shows greater irregularity of the surface, greater sensitiveness to touch, with areas of caseous softening. In carcinoma the induration is of a more stony character and the gland is bound down and immovable from infiltration. Chronic hypertrophy occurs in a person over fifty years of age with more or less bladder retention. The gland is generally enlarged, bulges into the rectum, often the upper end can be reached only with exertion by the palpating finger. Induration, infiltration, sensitiveness and other evidences of inflammation are wanting. Above the prostate the seminal vesicles and vasa differentia may be palpated and inflammatory conditions of these organs can be made out.

By bimanual examination we can often feel large vesical tumors and calculi. Inspection, palpation and percussion of the hypogastric region will enable us to make out a bladder distended with urine, or filled with a large tumor.

The kidneys are palpated with the patient in the dorsal recumbent or lateral position, the fingers of one hand placed on the loin just below the last rib, those of the other on the front of the abdomen just above the umbilicus. Except in very thin women, with relaxed abdominal walls and on the right side, the normal kidney cannot be palpated. With the finger tips as closely approximated as possible, the patient taking a deep inspiration, if the lower pole of the kidney can be felt, as a rule it is either enlarged or displaced. Palpation enables us to make out the size, shape, position and degree of sensitiveness of the organ. A painful kidney means the presence of stone, a pus focus, tuberculosis or tumor. An enlarged kidney means either tuberculosis, calculus, pyonephrosis, hydro-nephrosis or malignant disease.

Instruments used in the diagnosis of urethral affections: Blunt-pointed steel sounds from 16-26 F. are used to diagnose the existence of strictures of large caliber. For strictures of

small caliber below 16 F. the small-sized sounds should be used with great caution. For tight strictures below 5 F. we have to use the whalebone filiform bougie, over which, if successfully passed, a Gouley tunneled catheter is threaded. Some prefer to use the flexible bulbous bougie for diagnosing the site and size of a stricture. The Otis urethrometer is also used to measure the size of a stricture and dilate the same. For ordinary purposes, however, the steel sound is all that is necessary for diagnosis and treatment.

The endoscope, or urethroscope, in skilled hands is a valuable instrument for diagnosis. Infiltrations of the urethral mucous membrane such as occur in strictures of large caliber are diagnosed by the pale color of the membrane, its lack of luster, and the decrease in the number of its striations as the instrument is removed. In chronic anterior urethritis localized hyperæmic areas are readily made out, especially at the penoscrotal junction and fossa navicularis, the seat of future strictures. Patches of membrane covered with granulations which bleed easily when touched are also readily demonstrated. When inflamed, Littre's glands appear as dark red spots and the lacunæ of Morgagni as slit-like openings in the mucous membrane. Foreign bodies, calculi, ulcerations, tuberculous or otherwise, tumors, benign or malignant, require the use of the urethroscope for ultimate diagnosis. With Swinburne's posterior urethroscope, congestions, ulcerations, etc., of the posterior urethra can be seen. We can also observe the amount of atrophy or hypertrophy of the verumontanum and the appearance of the openings of the prostatic and ejaculatory ducts.

In enlargements of the prostate the increased length of the prostatic urethra is measured by the soft rubber catheter, and the increased curve by the prostatic metal catheter.

The amount of retained urine in the bladder is measured by the soft rubber catheter. All other indications for the use of instruments to be introduced in the bladder for diagnostic purposes are met with by the modern cystoscope. It is the *instrument de précision* in the diagnosis of most surgical affec-

tions of the bladder and kidneys. Inflammation of the bladder, both acute and chronic, are made out by the increased redness of the mucous membrane and dilated blood vessels in the former case; and the puffed, swollen appearance and increased secretions deposited on its surface in the latter. Foreign bodies movable or encysted calculi, can be directly seen and their size and consistency estimated. Vesical tumors are located and their macroscopical appearance noted. Small portions may be removed for microscopical examination. In tuberculosis of the bladder, tubercles may be seen in the early stage and ulcerations in advanced stages. The amount of projection into the bladder of a lobe or lobes of the prostate gives an idea of the extent of the hypertrophy of this gland. For vesical calculi the Thompson stone-searcher and the X-ray photograph have their uses, where, as in enlarged prostate, the cystoscope cannot be introduced.

In cases of pyuria or hæmaturia, after the bladder has been thoroughly irrigated and the cystoscope introduced, the appearance of urine mixed with blood coming from one or both ureters demonstrates the source of the trouble. For more accurate diagnosis in kidney affections ureteral catheterization enables us to ascertain what these organs are individually secreting and excreting. Moreover, in cases where it may be necessary to remove a kidney, ureteral catheterization not only proves the existence of a corresponding organ, but also tells us whether it alone is able to functionate for both.

The merits and demerits of the different urinary segregators I will not discuss, for I have never used them. The ability to form a watershed in the bladder, so that the two streams of urine will not mingle and commingle seems well-nigh impossible in an organ that is subject to all kinds of spasms and contractions. Besides, any artificial hemorrhage that may be induced will of course interfere with the accuracy of the diagnosis.

An X-ray picture is the *sine qua non* of the diagnosis of stone in the kidney or ureter. A negative result does not always disprove the existence of the stone. Lack of experi-

ence on the part of the operator, a thick abdominal wall, a small stone lying behind a rib, may all contribute to the inability of obtaining a shadow when the calculus is actually present.

In conclusion I would add that with all these methods systematically carried out beforehand, it is possible to forecast the nature of the trouble to such a degree of accuracy that it will scarcely ever be necessary to resort to exploratory operations in order to arrive at an ultimate diagnosis.

DISCUSSION.

DR. P. DUNCAN LITTLEJOHN (New Haven): It has been my good fortune to have had the privilege of reading Dr. Coops' very interesting paper, and I thoroughly endorse all that he has said. In this, as in all other branches of medicine, we cannot hope to inaugurate a successful line of treatment, unless a correct diagnosis is first obtained; and in order to secure this knowledge, a detailed examination of the whole genito-urinary tract is imperative.

The doctor has covered the field so completely that there is little left for discussion, though there are a few points that I would like to emphasize.

Allowing 80 per cent. as a very conservative estimate concerning the number of infections of the prostate and seminal vesicles, or both, which follow in the wake of a gonorrhœal invasion of the posterior urethra, it is readily appreciated that particular attention must be directed to these parts when first examining the patient. So, too, every specific infection of the epidymus or the testicle must invariably be followed by more or less inflammation of the prostate or adnexa because of the anatomical relation of the parts. Hence, a careful digital examination of the rectum, as well as a microscopical examination of the expressed juice and urinary sediment, following massage of the prostate, should always be made when we suspect a present or previous infection of the posterior urethra.

This urinary examination suggests another important factor, which is of aid in localizing the point of disease in these cases. To those of us who have been brought up in the school of the brilliant Heitzmans, and endeavor to use their ideas of urinalysis in our daily work, the microscopic findings of the urine is a field from which much is learned concerning the clinical condition of the patient.

The speaker says that Casper and others do not admit that one can tell, with any degree of certainty, from what part of the genito-urinary tract the different epithelial cells seen in the urine are derived. I will leave the argument of this much disputed fact to those better

fitted to uphold the well-known views of Heitzman, and will only say, that personally, I have been able, with aid of the urinary sediment, to clear up many doubtful diagnoses as well as to substantiate those already arrived at. Of course there are always some epithelia which one cannot positively identify, but the majority of cells seen can usually be classified so as to assist the clinical findings to a marked degree. The proof of these statements can easily be made if one will select a case which is known to be suffering from a prostatitis, and, after massaging the prostate, characteristic epithelia from the gland and its ducts are seen in the urinary sediment; while if a diseased bladder or kidney is present, we are always able to demonstrate the cells from these organs.

Permit me to mention one more fact relating to the prostate. When a man in early middle life or later years presents himself complaining of *any difficulty whatever* with urination, do not fail to make a careful search for hypertrophy of the gland. The mere fact that no enlargement can be noted in the rectum does not rule out this unfortunate condition. An exact measurement of the posterior urethra, a determination of the presence or absence of residual urine and a cystoscopic examination, will often reveal a protruding bladder lobe which might be easily overlooked; for an early diagnosis of an enlarged prostate is of inestimable value both to the patient and to the surgeon. The first may be saved a long continued amount of suffering, to say nothing of the dangers to which he is exposed from a prolonged cystitis, which might cause an ascending ureteral infection, or any of the kidney lesions that result from back pressure of residual urine; while the surgeon, who receives the patient following an early diagnosis, is sure to get much better results, both immediate and remote, if an operation is decided upon.

Only a few months ago a patient consulted me who had been treated for several months for a chronic urethritis. He was only forty years of age, and a very well-preserved individual. The prostate was very hard and dense, but not enlarged per rectum. Further examination, however, showed ten ounces of residual urine present, the posterior urethra lengthened three-quarters of an inch, and the cystoscope revealed a prominent middle lobe of the prostate. The same was removed by operation and a perfect recovery resulted. This was a case one occasionally sees of a dense, hard prostate, with scarcely no lateral enlargement, which of course caused it to remain unrecognized for some time.

One other point in making a diagnosis is the pain from which the patient complains. Although there are a number of conditions of the tract in question which exhibit characteristic painful areas, it has become my custom to attach very little importance to the pain these

people speak of when determining the site of the lesion. The nerve endings of the urethra and bladder are so complex that the individual oftentimes is mistaken in judging the seat of the trouble, because he assumes that the pain and the lesion must be coincident as to locality. Many of you have seen an occasional case of renal colic where nearly all the pain is referred to the bladder, or even to the testicle. I have at present a man under my care who suffers intensely with pain in the anterior urethra, which the cystoscope has proven to be caused by a tubercular ulcer of the bladder. I do not mean that we should disregard pain as not being an important feature in the clinical history, but we ought not to be influenced in locating the site of the lesion by the patient's statements concerning painful areas.

Again I wish to thank Dr. Coops for presenting a very instructive paper in locating lesions of this tract; for diagnosis is the rock on which all successful treatment of disease must rest, and in consequence, we cannot afford to allow ourselves to overlook any detail in examining these patients, if we hope our therapeutic measures to result favorably.

DR. CHARLES S STERN (Hartford): The paper of Dr. Coops omits nothing of the many devices utilized by urologists of to-day, and evidences that he is fully conversant with the subject of his paper, and I can but agree with him in all that he has said. What I may add shall be only in amplification of the incomparable assistance in diagnosis rendered by the urethroscope and by the cystoscope. These instruments are so little appreciated by practitioners in general, after the many years of their demonstrated efficiency, that it seems more than necessary to again urge their importance in the diagnosis, and especially in the localization of lesions of the genito-urinary tract. The axiom "seeing is believing" has become a possibility here, more perhaps than in any other regions of the body. Palpation, to be sure, tells us much—when it can be absolutely applied to the offending object—but too often this is inaccessible to the finger tips in more or less of its position and completeness; and although it is often possible to diagnose a *tumor*, or *foreign body*, by the method of palpation, either with the finger tips or instruments in the bladder, the character of the same, the accompanying inflammatory conditions, the amount of obstruction, its actual size, and other accessory conditions which the eye can observe, shows the additional importance of getting your data with these instruments. And when the question of operation is discussed, the manner of performing this so as to obtain the best results can often be thus determined. I have selected a few cases at random, from those in my own experience, which I think will better illustrate the points I wish to make. Cases I and II. Specimens of Calculus.

CASE III.—T. Had been previously treated for months ineffectively for subacute urethritis, sequel of gonorrhœa, by use of sounds, silver nitrate, etc.

The urethroscope showed hard, almost cartilaginous infiltrations of urethral canal from the penoscrotal junction into the membranous portion—an entirely unexpected condition, which yielded only to electrolytic treatment per urethroscope.

CASE IV.—T. Long treated as neurasthenic; prostatic symptoms; urethroscope showed hyperæmic caput galli and verumontanum, and ulcerations in the left prostatic fossa. Applications, locally, through urethroscope, finally cured all symptoms.

CASE V.—J. Treated for gleet upwards of four years. The acute urethral inflammation and discharge required some weeks' treatment before it was possible to use the urethroscope. Then I found 3 cm. above the meatus, an enlarged suppurating follicle of Morgagni. This was split up with knife, and proved to be the main cause of the trouble.

CASE VI.—M., female. Symptoms of cystitis and passage of crystals. Cystoscope showed inflammation of left ureter, both ureters active. Nephrotomy of left kidney, and removal of two stones from that organ composed of cystin.

CASE VII.—C. Cystitis symptoms—general pains, weakness and loss of strength, pain referred to both sides at different times (at least twenty similar cases). Cystoscope showed inflammation of left ureter meatus, and pus or cloudy urine issuing therefrom, while right ureter ejected clear. Operation on left kidney found extreme pyelo-nephrosis requiring nephrectomy.

CASE VIII.—In conclusion I would like to mention one of the most instructive cases in diagnosis that I have come across. This patient (a lady of twenty-eight) had been troubled with the usual symptoms of cystitis for a year. I saw her four months ago, and at that time the cystoscope showed a severe general cystitis very much intensified about the left ureter, so that it was impossible to definitely locate the opening. She was put under bladder treatment, and gradually improved in the local condition. A subsequent cystoscopy about two months later showed the cystitis much improved, with a healthy functioning right ureter. There was considerable papillomatous growth in the vicinity of the left ureter at this time, the opening being hidden behind one of them and it was impossible to enter with the catheter. The treatment was continued, and two months ago the cystoscope showed the generally improved condition of the bladder, and it was possible to observe some turbid excretion ejected from the left ureter. At this time I advised operation on the left kidney, but as her general symptoms were so much improved, at her solicitation, a postponement was agreed to. A week ago, as all urgent symptoms had disappeared,

the capacity of the bladder become almost normal, and all pains and frequency, etc., having disappeared, an examination was made to decide whether it was best to discharge the patient as cured, or to operate for removal of the focus of disease. This cystoscopy showed the bladder comparatively healthy, and both ureters were catheterized; from the right, clear urine was collected, while from the left turbid urine flowed. I then unequivocally advised operation on the left kidney, which was performed by Dr McKnight ten days ago. The kidney was removed and showed numerous abscesses of various sizes, some containing thick pus, others thin, turbid fluid. The condition thus shows the reason for the increase and subsidence of symptoms from time to time, and for the absence of typical symptoms of suppurating nephritis, as the case was operated before reaching that stage.

DR. FRANK H. COOPS (Bridgeport): I am rather glad that I was not able to read the last part of my paper, on the use of instruments for localization, because Dr. Stern has gone over this subject so thoroughly that my remarks would have been completely thrown into the shade by the discussion which he has prepared. I want to thank the gentlemen for the kind criticism of the paper, and to say that my main object in writing it was to stimulate the persons who work with genito-urinary cases to proceed in a systematic, methodical way in making a diagnosis. If this were done and we took more care in our diagnosis, the treatment of these cases would not be the bugbear that it is to the majority of practitioners.

Ocular Evidences of Systemic Disease.

M. H. GILL, M.D., HARTFORD, CONN.

It would require a large volume to enumerate the benefits that ophthalmology has conferred on clinical medicine, and it is with pride that we of Connecticut refer to Elisha North of Goshen, who studied medicine in Hartford with Dr. Lemuel Hopkins and who was the first physician in the United States to devote his practice exclusively to diseases of the eye. He instituted in New London, Connecticut, in the year 1817, the first ophthalmic hospital in this country, antedating by three years, as shown by Dr. Walter Steiner, the New York Eye Infirmary, which was established in 1820.

Ophthalmology has the closest relations with all other departments of medical and surgical science, and as the eye is the only organ in which we are able to view the blood vessels and nerves, we often find recorded on its delicate tissues, months in advance of other symptoms, indications of severe systemic disturbances, the early recognition of which may often prevent and frequently retard a fatal issue. As a nation's history is read page by page, so the tissues of the eye, from cover to cover, often reveal in indelible characters the many disorders, local and general, which afflict the individual.

What may we learn from faulty positions of the eyeballs? Exophthalmos, or undue prominence of the eyeballs, is one of the most constant signs of Graves' disease. It should always be sought in patients with increased pulse frequency, slight tremor of the hands, and enlarged thyroid. The peculiarities of this state of the eye, in addition to their protrusion, are the unusual width of the palpebral fissure, failure of the upper lids to follow the eye in its downward movement, and impaired convergence of the internal rectus muscles. Exophthalmos may be present in phlebitis of the cavernous sinus, in retro-

bulbar tumors, and in pathological conditions of the frontal, ethmoidal, and maxillary sinuses.

The opposite condition to exophthalmos is enophthalmos. This is seen bilaterally in the marked general wasting of prolonged fevers, etc.; and unilaterally it occurs as atrophy, secondary to inflammations and injuries to the eye itself. It is found also in affections of the sympathetic nerve from pressure of goiter, of aneurism, of enlarged mediastinal glands, and apical tuberculosis. This condition has associated with it pupil irregularity, redness, and interference with the sweat secretion of one side of the face.

A symptom to which our attention may be called is swelling of the lids. What may this indicate? We know it occurs in diseases of the heart and kidneys, and in arsenical poisoning. It is often, of course, a purely local manifestation. It may be a simple eczema, or the accompaniment of a sty. It may be of vasomotor origin—the so-called angio-neurotic oedema. It may be caused by toxins of vegetable origin, as poison ivy, sumach, etc.; by insect stings, and auto-intoxication from gastro-intestinal sources. It may be due to infection of the retrobulbar structures, to thrombosis of the cavernous sinus, or aneurism at the base of the brain. It may be one of the early signs of Graves' disease, especially when accompanied by pigmentation. It may be caused by erysipelas, particularly when there is a dacryo-cystitis present, and the ensuing complications are often critical.

Paresis of the ocular muscles is often found in constitutional diseases, such as syphilis, diphtheria, rheumatism, and diabetes.

Abnormal positions of the eyes are found in heterophorias and strabismus. The phorias and strabismus are most frequently due to faulty refraction and impaired development of the fusion faculty, and are usually amenable to correction when glasses are prescribed early. And when we say "early," we mean at the first appearance of a "crossed eye." Even in infancy, if the baby's eye muscles behave abnormally, the little one's refraction should be determined and proper glasses pre-

scribed. The prejudice against glasses and the belief in the spontaneous cure of squint are widespread among the general public, and the large number of children with strabismus who consult us have almost uniformly been assured that they will outgrow the defect, and are allowed to wait until they are four or five years old before wearing glasses. Worth of London, considered one of the best authorities on squint, puts glasses on infants even a year old, tying them on with tape; and he assures us that very few of the many squinting babies he has treated during the past fifteen years have required an operation subsequently. The eye that squints rapidly loses its acuteness of vision, and delay should not be counseled, as, even if in an occasional instance the eye should become straight in later life without operation, the vision is usually diminished to about one-seventh of the non-squinting eye.

Occasionally we find a child's eye deviating from some reflex cause, as teething, intestinal irritation, etc. If it is frequently repeated the child's refraction should be determined and suitably treated, as these so-called premonitory occasional squints are simply the precursors of constant squints and become constant after lasting usually from two to six months. Do not let fear that glasses will be accidentally broken and injure their eyes deter us from prescribing lenses for the little ones, as such accidents are exceedingly rare; and glasses prescribed early will save vision in eyes that would otherwise become almost blind, and if they do not correct the deviation, they will at least preserve good vision in the eye while the fusion faculty is developing, which is well advanced by the twelfth month and is complete about the sixth year.

Nystagmus, or oscillation of the eyeballs, is one of the classical signs of multiple sclerosis. Drooping or paresis of the lids is frequently a sign of general disease. It may occur in hysteria, when with it the other stigmata usually coexist. It may be one of the earliest manifestations of tabes. It is seen in diseases of the motor-oculi nerve trunk. It occurs in tumors and fractures at the base of the brain, in general paralysis of the insane, and in multiple sclerosis.

On separating the lids the cornea and conjunctiva are exposed. We should never fail to test the corneal reflexes. Impaired sensibility is one of the most constant signs of the hysteria stigmata. We find it again in disease of the fifth nerve and with some ulcers.

Inflammation of the conjunctiva occurs in so many of the exanthemata that it merits our attention. The acute inflammations accompanying scarlet fever and measles are often attended with disastrous results if proper attention is not afforded. Other constitutional conditions are manifested in the nodular elevations of the scleral conjunctiva in rheumatism, the efflorescences in eczema, the muddy conjunctivæ and flabby eyelids of the pretubercular stage, the chemosis and hemorrhages in pertussis, and the membranous deposits in diphtheria. These all demand general as well as local treatment.

While on the subject of conjunctivitis it does not seem amiss to emphasize the importance of the differential diagnosis between acute conjunctivitis, acute iritis, and acute glaucoma. To mistake one of the last two named for a conjunctivitis is to be a party to the possible production of blindness in the patient under observation.

It is very essential to always determine the tension of the eyes, especially in patients over forty, before employing atropine, and thus avoid the dangers incident to the use of this drug.

Gonorrheal infection of the conjunctiva is one of the unhappiest experiences. The excessive discharge, the great swelling of the lids, and the œdema of the ocular conjunctiva produce a softening of the cornea, which seldom escapes permanent injury. A large percentage of all cases of blindness can be traced to this source. The diagnosis is easy. A slide will show the bean-shaped coccus. The prevention lies largely with the medical attendants. The instillation of one or two drops of one per cent. nitrate of silver solution in the eye of the newborn has been demonstrated to be a specific preventative and should be obligatory by statute. The law should

require the report of all births to be delivered to the health board within twenty-four hours after the birth, with an express statement as to whether or not the silver nitrate were instilled. It frequently happens that no physician is in attendance, and midwives and neighborhood nurses are often derelict. The incubation period is usually three days, and this would give the health board forty-eight hours in which to apply this simple but effective agent, as its application, even though delayed, is effectual in checking and diminishing the disastrous sequelæ of this disease. The committee of the American Medical Association appointed to investigate this subject report, after extensive experiments, the nitrate of silver in one per cent. solution superior to other silver preparations such as argyrol, protargol, etc., and urge its universal employment, as it causes no injury to the ocular tissues and will prevent gonorrheal ophthalmia.

No structure of the eye is exempt from the ravages of syphilis, both inherited and acquired. In the inherited form the Hutchinson teeth and white scars about the mouth, the malformations of the palate and nose, the exostoses, etc., are but slight defects compared with the white spots on the cornea, which obscures vision and condemns the afflicted to an unhappy existence. It usually attacks both eyes, either simultaneously or successively, and manifests itself between the sixth and twentieth years of life, being only exceptional before or after these ages. The cornea also suffers in the acquired form of syphilis, and the vision is frequently impaired to a marked degree.

The pupils next attract our attention, and through the study of their size and reaction many valuable hints are obtained. The Argyll-Robertson pupil, one which reacts to convergence but not to light, has long been known as one of the most constant accompaniments of tabes. It is not peculiar to tabes, but occurs in cerebral syphilis and general paralysis of the insane. We can recall several cases of the latter disease which were detected in their incipiency, before the delusions of grandeur stage appeared, largely through the presence of

the Argyll-Robertson pupil. The size of the pupils, their equality or irregularity, can be of great aid to us. Inequality of the pupils is always a pathological phenomenon: the pinpoint contraction of opium poisoning, the dilated pupil of belladonna toxemia, the small pupil of brain irritation in early meningitis, the unequal size in brain tumor or cranial fracture, the widely dilated and inactive pupils of epilepsy—all are frequently seen. Paresis of the pupil, failure to react to light and accommodation, follows blows which produce multiple ruptures of the iris. It often occurs after diphtheria, and when a child's distant sight remains unimpaired and he complains of inability to read print held near the face, the physician will not go very far afield if he makes a careful inquiry into the history of diphtheria.

As we proceed more deeply into the interior of the eye, the iris comes prominently into view as a seat of local trouble largely dependent on disease elsewhere. Here syphilis and rheumatism tell their tale. Tuberculosis, anæmia and gonorrhea leave their impress in varied forms of iritis. Syphilitic gumma, tubercular nodules, and malignant growths, especially sarcomata, appear in this tissue. A recent case of melanotic sarcoma of the iris illustrates the tendency of this form of tumor to form metastases in the liver. A lady, aged forty, in good general health, consulted us about one year ago, complaining of pain in the right eye and gradual blurring of vision. There was increased tension in the eye and a tiny growth in the iris, about a pin-head in size. The nodule gradually increased to the size of an ordinary birdshot. The eye became glaucomatous and blind and was enucleated. A section of the growth showed it to be a melano sarcoma. The patient's friends were informed of the probability of a secondary growth in the liver. Some six months later she underwent treatment in a Springfield, Mass., hospital for persistent abdominal pain, gastritis, and hemorrhoids. No relief was obtained. About three months ago an exploratory abdominal section by Dr. George C. Bailey revealed a tumor of the liver, a section of which proved to be melano sarcoma.

The patient died two months later. There was no recurrence in the orbit.

For want of time we will pass the numerous evidences of systemic disease exhibited by the crystalline lens and vitreous humor, only mentioning the prevalence of cataracts in diabetes and the ravages of syphilis in the vitreous, and proceed to the retina.

How often does the oculist discover the first recognized evidence of a developing chronic nephritis? It is a well-known fact that nephritis in its varied types, acute and chronic, may exist unrecognized by the urinary symptoms, and since it is curable only in the stage of functional albuminuria, it is unnecessary to emphasize the importance of its early recognition. The contraction of the retinal arterioles, the white lines of beginning sclerosis, the minute hemorrhages, the hypertension in the arteries, which are part of a general primary vascular hypertension, are manifest here preceding urinary evidence of the concomitant sclerosis of the tubules, glomeruli, and parenchyma of the kidneys. If the arterial hypertension that marks their beginning is not recognized early, or for any reason treatment is not instituted until a hard, unyielding, radial artery, accentuation of the aortic second sound, cardiac hypertrophy, impaired vision, and uremic poisoning are present, the sclerotic process, it may be assumed, has likewise invaded the kidney, whether albumin and casts can be demonstrated or not. To illustrate this condition, we might quote a recent case. A strong, robust, plethoric business man, aged forty-five, personal and family history negative, consulted us about fourteen months ago for reading glasses. We found a small retinal hemorrhage in his left eye and referred him to his family physician, who made a thorough physical examination and could find no evidence of cardio-vascular or nephritic change. The urine, on repeated examinations, was negative. Three months later a small hemorrhage occurred in the right eye. He was again carefully examined, and frequent tests of the urine revealed no evidence of nephritis. His physical condition was excellent; as he expressed it, "I never felt better

in my life." Several physicians were consulted in the ensuing six months, but no pathological conditions, aside from the ocular ones and a persistent increased arterial tension, could be demonstrated. The urine was absolutely negative until about three months ago, when he developed acute nephritis and died two months later of uremic poisoning. This case conforms to the assertion of Richard C. Cabot of Boston, that "to attempt to establish the anatomical condition of the kidney by measurement of albumin and the search for casts is fallacious in the extreme," and tends to confirm the opinion of Fuchs that a fatal issue may be expected inside of two years from the appearance of albuminuric retinitis. Several analogous cases could be quoted if time permitted.

Inspection of the optic nerve frequently reveals incipient systemic diseases before they are manifest elsewhere, and a careful study of this nerve will often afford valuable aid in diagnosing obscure conditions. Syphilis and kidney disease are responsible for many of the inflammations which attack this part, and which leave in their wake atrophies and subsequent paralysis or total blindness. One of the earliest and most constant signs of tabes is atrophy of this nerve. Any modification of the patellar reflexes calls for a knowledge of its condition. It is a demonstrated fact that pronounced early atrophies accompany only those cases of mild general tabes, and, inversely, severe general tabes shows the milder involvement of the optic nerve. Here, naturally, we expect to find the Argyll-Robertson pupil, occasional paresis of the extrinsic ocular muscles, and other signs and symptoms of tabes.

Acromegaly manifests itself through early atrophies. Multiple sclerosis, in the general invasion of the brain, cord, and nervous system, seeks also a pathway here. The outer segments of the nerve succumb to the inroads of this disease. General paralysis, multiple neuritis, myelitis, toxins, chemical poisons (as lead and arsenic), show no mercy to this visual organ.

Papilledema, or so-called choked disc, is found in hydrocephalus, especially the acute and so-called serous meningitis,

and in about eighty per cent. of brain tumors and some abscesses.

That cranial tumors may exist for some years with none but ocular manifestations is demonstrated by the following case, which I would like to present:

Miss Louise V. ——— of Torrington, Connecticut, aged forty, consulted us November 23, 1908. Her family and personal history were negative, aside from a slight injury to the left forehead from a fall in February, 1907. There was no loss of consciousness or external evidence of injury at the time of the fall and no attention was paid to it. During the years 1907 and 1908 the vision of the left eye gradually diminished and an "optometrist" was consulted, who furnished glasses which, of course, afforded no relief. In November of the latter year blindness in the left eye was complete, and a persistent blurring of vision of the right eye, such as occurred in the left two years previously, was observed. This caused her to visit a Hartford optician, who was less commercial than the first and advised her to consult an oculist. An examination revealed papilledema or choked disc of six dioptries in the left eye, with beginning atrophy and complete blindness in that eye. The right eye showed choked disc of five dioptries, with vision five-sevenths normal. This eye was evidently pursuing a similar course to the left and the patient would eventually become totally blind. In consultation with her family physician, Dr. J. H. Bissell of Torrington, and Dr. Oliver T. Osborne of New Haven, a slow-growing cerebral tumor or exostoses in the region of the sella turcica was diagnosed, Drs. W. W. Keen, F. X. Dercum and G. DeSchweinitz of Philadelphia concurring. A decompression operation was performed by Dr. Keen on January 8, 1909, concerning which I will quote from his letter to me:

"A large opening was made in the right temple. The dura was very tense and at the first incision the cerebro-spinal fluid, which was clear, spouted nearly two feet in the air. The brain protruded markedly through this opening and I had some difficulty in covering it with the temporal muscle; in fact, the fascia of the muscle, in spite of

considerable tension, I was unable to approximate, and had to leave a gap of about one-quarter of an inch.

"I am very much obliged to you for your kindness in referring this very unusual case to me. I think I have never before seen a case of cerebral tumor which showed so few symptoms."

The patient's vision has improved to normal in the right eye since the operation; the left eye, of course, being hopeless.

Her physical condition is excellent, as you can observe. There is no interference with speech or deglutition, no pareses of any kind, heart and kidneys normal, and there are absolutely no physical signs of cranial tumor except the ocular ones.

The three cases cited, viz., the melanotic sarcoma of the iris terminating fatally inside of ten months from metastases in the liver, the case of nephritis exhibiting hemorrhages in the retina almost one year before urinary symptoms, and this case of cranial tumor with no physical signs other than the ocular ones, are three cases that I think any life insurance company would have accepted as good risks and would pass any physical examination that did not require an examination of the eyes.

The visual fields are very valuable in diagnosis. This is especially true in hysteria, through its inverted color fields. It is of equal importance in organic brain lesions. Their examination is very necessary in differentiating the functional from the organic affections. The study of the many forms of hemianopia, the simple bitemporal and homonymous hemianopias, are essential in accurate brain work. By them we are in a position to determine whether the lesion is basal, in the optic tracts, occipital lobes, or elsewhere.

Many additional conditions might be adduced, but it is impossible in a paper of this kind to go more deeply into the matter. This is not intended to be exhaustive, but simply a few suggestions to those who have not the opportunity to become well acquainted with eye disorders.

To summarize—I would emphasize three points.

First—The importance of using silver nitrate solution in the eyes of the newborn, and the making of that practice obligatory by statute.

Second—The necessity of examining a child's refraction on the first appearance of a "crossed eye."

Third—The frequent inspection of the eyeground in general constitutional disturbances.

DISCUSSION.

DR. EDWARD M. McCABE (New Haven): I find that it is almost impossible for me to add anything further on the subject assigned to Dr. Gill. I merely desire, therefore, to emphasize the point he has brought out concerning the early recognition of cross-eyes and the application of the proper treatment to prevent further muscular deformities.

DR. E. TERRY SMITH (Hartford): I thank Dr. Gill especially for drawing attention to the importance of the early treatment of cross-eyes, which, in most children under five years of age, by exercises and the proper application of glasses, can be cured.

Very many people have an idea that Bright's disease can be diagnosed in its early stages from the appearance of the eye, but in the greater number of cases we find the disease existing long before any ocular symptoms are noticed by the patient. We generally have a chronic nephritis, and if we examine the heart at this time we discover a dilated left ventricle and other chronic conditions, but the manifestations in the eye are usually not early, but late ones.

The importance of examining the optic nerve in epilepsy and in cases where we are liable to have brain pressure is obvious. I have seen a case similar to that described by Dr. Gill. The patient was a young man who was suddenly seized with epileptic convulsions and who also had a slight optic neuritis. He consulted several oculists and was treated in various sanitariums for a number of years, but his vision failed gradually, and he finally became totally blind. He was having convulsions every day, and his disposition, which had been a happy one in childhood, became melancholy. An operation, which was considered imperative, even though life were sacrificed, was performed by Dr. McCosh, of New York, who has recently died. The conditions were found to be very much like those described by Dr. Gill. It is now a year since the operation, and the patient, who made an uninterrupted recovery, has had only three or four convulsions. He is happy, has learned to read Braille, and can use the typewriter.

Among the conditions early manifested in the eye is hysteria. I have gathered a number of cases of hysterical amblyopia, occurring in children under twelve years old, which I intend to publish. Upon examination no pathological condition was found in these cases, but the vision was so reduced that the patients could hardly see large objects and the fields were so contracted that it appeared as if they

were looking through a tube. Each case of this kind which I have seen has cleared up under proper systematic treatment.

DR. OLIVER T. OSBORNE (New Haven): Dr. Gill has asked me to read my notes in connection with that very interesting eye-case. If I read to you the carbon copy of the letter that I sent to Dr. Bissell, after seeing this patient in consultation, it will explain itself sufficiently:

"There is no trouble chemically or microscopically with the urine. This rules out any diabetic or albuminuric reason for the eye conditions. As the heart is perfectly normal and seems to have always been so, and as there were no infections or localized inflammations, we can rule out emboli as a cause of her condition. I do not believe syphilis is a cause of the condition.

"I do believe that the injury of February, 1907, is at the bottom of the trouble. I do not believe there is a tumor growing in the brain proper. I think that there is probably either a slow-growing bone growth in the region of the sella turcica or some tumor growth, perhaps a glioma, in the sella turcica, which is causing her symptoms. Either of these conditions might proceed from the injury. I have seen two cases lately of optic trouble similar to hers that have improved under mercury and iodid. One was syphilitic; the other was not. Certainly there is no treatment that holds out any possibility of aid except such treatment, *i.e.*, mercury and iodids to cause resorption of exudates and growths.

"I should therefore give her sodium iodid internally, at first 5 grains three times a day, after meals: then in four days 8 grains three times a day; and in four days more, 10 grains three times a day. This I think is enough; I do not believe in enormous doses of iodid, especially when given in conjunction with mercury. I would rub in every night, alternating different parts of her body, a piece about the size of a small hazelnut of oleate of mercury.

"If in two weeks she says the sight in her right eye is worse, I would have her see Dr. Gill immediately. If the sight in her right eye is better or at least no worse, I should wait three weeks. At the end of three weeks I would then have Dr. Gill see her, and if he says that the right eye looks worse, I should then take her to Dr. Keen of Philadelphia, as the man who has had the most experience with brain surgery in this country, as far as I know. If there is improvement, I then should keep on with the treatment. The condition, of course, is exceedingly serious.

"Thank you for referring the patient to me, and please keep me informed of her condition."

I notice that the gentlemen in Philadelphia have not said what kind of tumor the growth is. In a letter, Dr. Keen says that the tumor will still grow. This was his opinion at that time. The patient's present health is certainly unusual in a case with such a history.

I am not competent to discuss the eye end of the splendid paper of Dr. Gill, but I was a little surprised to hear him say that there must be some pathological reason for a difference in the pupils. I thought that difference in the optics of the eyes might make a difference in the pupils, without there being any pathological reason.

DR. D. F. SULLIVAN (Hartford): The subject of ocular manifestations of systemic diseases is so comprehensive that it appeals even to the ordinary layman. Some weeks ago we had a symposium here on the subject of tuberculosis, which continued for two hours and a half. I was not quite satisfied concerning one point in regard to this, and I wish to ask a question about it of the gentlemen present.

It is a well-recognized principle that anything that will lessen our vital resistance or increase our vulnerability to disease decreases our ability to prevent ourselves from being infected. If the universality of tuberculosis and its enormous death rate are accepted, it must also be accepted that there is some other factor at work in opposition to these. If not, as we are all exposed to infection, this world would soon be one great mausoleum. The early symptoms are the accelerated pulse and the loss of weight. The cardinal reason for investigating symptoms that disturb digestion is well known, and even laymen know that errors of refraction and unbalance of the ocular muscles will interfere with gastric and intestinal secretion. Therefore, metabolism is retarded and the patient's power to resist disease is lessened. On this account, I make the point of how careful we should be to investigate eye troubles in children, especially in tuberculous families. Exophoria and dilated pupils are definitely correlated. We also know that a combination of these conditions may bring about disaster in the mid-brain.

If these views which I am giving out to-day are correct, it must be vastly important to attend early to eye troubles in the large number of persons who suffer from tuberculosis. Therefore, my conclusion is that no examination of the tuberculous child is complete that does not include an examination of the balls of the eyes, as well as of the dynamics of the muscles.

DR. GEORGE BLUMER (New Haven): This is a very important subject, and one often neglected by the general practitioner. I simply want to mention two or three points.

One of the diseases that can often be recognized by the oculist before the internist is arteriosclerosis. Dr. Gill may have had this in his paper, but it was not mentioned, and it is a point that ought to be emphasized.

There are also one or two points in connection with the eye lesions of interstitial nephritis. One often overlooks them. The fact that chronic interstitial nephritis can produce a picture in the background

of the eye essentially like that produced by brain-tumor; that is, choke-disc. This point has not generally been noted in text-books, but it was emphasized by Dr. Charles Burr of Philadelphia a good many years ago. If observed, it leads to the avoidance of errors in diagnosis.

Another point has recently been emphasized by Barker and others, and that is that in cases of chronic interstitial nephritis we can get exophthalmos, especially in patients who are in a uremic or nearly uremic condition.

DR. MICHAEL H. GILL (Hartford): The paper was not intended to be exhaustive, but for those who have not the time or opportunity for eye-investigations. In answer to Dr. Osborne, I would say that it was considered by as good an authority as Fuchs that a difference in the pupils is always pathological. In amblyopia focus the condition is abnormal.

I am grateful to Dr. Sullivan, and sorry that his discussion could not be continued.

Dr. Smith spoke of delayed manifestations of albuminuric retinitis. Fuchs says that we can look for a fatal termination at the end of two years. My patient, I am sorry to say, is not present, though I had expected her. Her cranial tumor has been in existence for two years. Instead of consulting oculists, she consulted so-called optometrists. This fact is interesting, because there is a bill before the legislature in reference to licensing them. This case shows the necessity for controlling their licenses. They are not competent to diagnose cases. This woman is going blind in the other eye. The last optometrist was more conscientious than the others, and sent her to an oculist. There should be some legislation to assure us that they are competent to diagnose severe conditions. In selling glasses, they should know the exact ocular condition that they are dealing with. The hearing before the legislature is to take place soon. The optometrists have employed legal talent to protect their claims. If they succeed in getting this law passed, they can show their licenses to purchasers who come to their stores, and say that the State permits them to treat eye conditions. They will thus delude the public into the belief that a competent person is attending them. These licenses can be obtained with the aid of a little correspondence and the payment of twenty-five dollars, by persons who do not hold diplomas.

I wish to thank the gentlemen for their kind discussion of my paper.

Partial Responsibility of the Insane.

FREDERICK T. SIMPSON, M.D., HARTFORD, CONN.

Responsibility has been recently defined by Mercier as "not a quality of the person who has inflicted pain, but a demand on the part of others that he shall suffer." I do not accept this definition as correct, but I do agree with Mercier in the general argument accompanying it, that the first and strongest feeling which arises naturally in the human mind on learning of a crime perpetrated by somebody, is the feeling of pain merging at once into the desire for retaliation, or the demand that he who inflicts suffering shall be made to suffer, and that it is as true now as it always has been that the primary aim of punishment is not to deter, nor to reform, but to punish.

Like every other institution, the courts are created by the people and are dependent upon the approval of the finally prevailing sentiments of the community. No opinion by any judge would become a part of the law, did it not commend itself to the predominating intelligence in that community. Prince remarks that "while as a matter of fact the law recognizes that there are effects of disease upon the mind which ought to relieve the individual of criminal responsibility, yet it is logical and permissible if public policy so directs, that no relief of responsibility shall be admitted because of insanity." Through untold ages of human existence this was undoubtedly the actual practice, and even to-day the feeling is a common feeling in great numbers of men that, whether he be insane or not, the criminal shall be made to suffer.

The prosecuting attorney, if he truly represent the people, must have strong within him the sense of retributive justice, this determination that the guilty man shall not escape. Only clear and weighty reasons may shake this determination. Every criminal must be held responsible until it has been fully

demonstrated that he is not responsible. This is plainly the temper of the Anglo-Saxon community. There is at once evidenced a profound dissatisfaction and anger when a man who has deliberately killed another, and who before and after this crime has given no palpable evidence to the ordinary mind of an exculpating mental derangement, escapes paying any penalty for his act on the claim of insanity, and is shut up temporarily in an asylum from which he demands almost at once to be released on the ground that he is again a sane man. Furthermore, when four or five medical men are seen to be arranged on opposite sides and invariably to give their opinions in accordance with the side by which they are employed, there naturally arises in the public mind doubt both as to the knowledge and as to the trustworthiness of the medical profession upon the subject in question, and there is almost no limit to the sarcasm and invective often indulged in. While efforts are being made in various states to modify the present methods of the employment of experts, so that they shall correspond with the much fairer procedure which obtains in the continental countries of Europe, the deeper question remains to be settled in the ranks of the medical profession itself, as to how far responsibility is actually affected by the various forms of mental disease.

Of all classes in the community, physicians are, by reason of their calling and experience, the most humane and the most lenient. They have done most to alleviate the wretched conditions of the insane, and their attitude is necessarily one of profound sympathy and solicitude in their behalf. But while studying all other aspects of insanity, they devote but little thought to this question of responsibility. In most of our standard authorities on mental diseases, this question is entirely omitted. The tendency with medical men has been to deny responsibility to any insane individual, and they have striven from time to time to modify the rulings of the courts so as to give wider latitude to the conception of insanity. It is on account of this immense broadening of the field of insanity by the modern study of the subject, that the question of responsi-

bility becomes of the greatest importance as well as one of the greatest difficulty.

For centuries mental diseases were grouped under the three simple divisions of mania, melancholia, and dementia. I cannot even mention the elaborate classification of to-day, but I remind you that our most recent psychiatries describe in their contents as psychoses, or psychoneuroses, such diseases as neurasthenia, hysteria, psychasthenia, alcoholism, and all forms of narcomanias, sexual perversions, and other conditions never before included under the term insanity. There are great numbers of people in positions of trust and responsibility who are from the modern medical viewpoint mentally unsound, or insane. Furthermore, physicians practicing outside of asylums see a great many cases of mild manic-depressive insanity, mild involutional melancholia, mild paranoia, dementia præcox, paresis, etc., forms so mild in character as not to be recognized except by those well versed in the features of these several diseases. There are, in other words, all degrees of departure from the normal type of mental soundness. It is, therefore, an absurdity for the law to require that physicians shall declare a man either totally sane and responsible, or totally insane and irresponsible. On the contrary, the fact must be recognized that there are different degrees of impairment of responsibility, as there are different degrees of impairment of any and all of the other powers and capacities of the individual.

Contrary to Mercier, I believe that responsibility must be regarded as an attribute or quality of the individual. Responsibility stands for the capacity to know and to conform to the ethical standards of the community. The infant has no responsibility as it has no knowledge. Responsibility develops gradually in the individual, with the development of the other powers, and it undergoes degrees of impairment, as do the other capacities and powers. The man who progressively increases his indulgence in alcoholic drinks, at length reaches a point where there is progressive impairment of perception and appreciation of the ethical standards and of power to conform to them. In less and less degree can he be held responsible for his conduct. But responsibility of some degree

continues as long as there is any capacity to know and to do. The psychasthenic who for weeks at a time is beset with insistent ideas and impulses to jump off from some high place, to cry out in public assembly, to commit some sort of violence, but who can as a rule prevent these impulses from being translated into action, is neither wholly responsible nor wholly irresponsible. The different degrees of mania, of which Weygandt reckons six, such as mania mitissima, hypomania, classic mania, delirious mania, etc., imply very different degrees of impairment of intellect and will, of knowledge and self-control, and so of responsibility, which is based upon them. In all forms of insanity, as in all other diseases, we find mild, well-developed, and violent cases, in which all the qualities and attributes of the individual are impaired in varying degrees. A great many patients belonging to the classes I have mentioned as mildly insane cannot and should not be shut up, or restrained in their liberties. Allowed to go at large, they must be held responsible for their conduct. In point of fact, they know and obey the laws of the natural world, of the business and social world most of the time. Like all other people, they can do wrong, and when they do wrong, they acknowledge it, or excuse it, in the natural way. At the insane ward of the Connecticut state prison, the cases belong almost wholly to mild or moderate types of mental impairment. Delusions are common enough, but moral offenses are very rare. Occasionally an insane prisoner on entering the ward may be unruly, or even commit an assault upon an officer. If he is at once soundly thrashed, as usually happens, he never repeats his offense. Punishment has the same deterrent effect it has upon the sane. In point of fact, with many insane persons, the knowledge of right and wrong is well preserved, and a large portion of them are in their outside social relations well-behaved persons.

In his recent text-book on "Criminal Responsibility," Mercier has put the matter this way:

(1) Some persons are so deeply and completely insane that we are not warranted in punishing them for any offense they may commit.

(2) The majority of insane persons are sane in a considerable proportion of their conduct, and when in this part of their conduct they commit offenses, they are rightly punishable.

(3) Since the limits between the sane and insane areas of conduct of insane persons are ill defined, no insane person should be punished with the same severity that would be awarded to a sane person for the same offense.

Some years ago Eskeridge wrote, "Every state should have a criminal insane asylum in which all the insane who have taken human life should be committed for the remainder of their lives. In the absence of a criminal insane asylum they should be imprisoned in a state penitentiary for life."

In a paper read before the New York Psychiatric Society in May, 1907, Dr. Pearce Bailey remarked that "nothing had been more plainly taught by recent advances in psychiatry than that different states make different degrees of responsibility, and in recommending the method of a commission to be appointed by the court to examine into the mental state of the prisoner suspected to be insane, he urged that the commission should report whether the defendant was fully responsible, partially responsible, or irresponsible, and that partial responsibility in capital cases should be sufficient to remit the death sentence; but no one who had committed murder, and who was acquitted on the ground of partial responsibility, should be restored to liberty under ten years; in other felonies partial responsibility should have the shorter sentence optional with the judge." In the discussion following, Dr. Allen McLane Hamilton agreed with Dr. Bailey concerning the ten-year confinement of individuals acquitted of murder on the ground of partial responsibility. Dr. Charles L. Dana declared that the question of partial responsibility was an important one, and if all alienists would accept the idea of partial responsibility, it would have its effect upon the method of procedure. Dr. Adolf Meyer said that, in practically all European countries, partial responsibility had been accepted in some form.

I have made these references in order to show that the question of partial responsibility is already before the profes-

sion and in the way of general acceptance. In New York the State Bar Association and the medical societies have gotten together and recommended a law for judicial procedure in the matter of expert testimony, which has already passed the Assembly under the name of the Fowler bill, of which the *New York Times* says, "It will do much toward restoring the dignity before the public of the medical profession in its legal aspect." I would urge that steps be taken looking to similar legislation in Connecticut.

Returning to my subject, I will briefly present a case, illustrative of partial responsibility of the insane.

D—— shot three times wildly about an officer who was going to take him to a retreat, then barricaded himself in his room, and a few hours later shot and nearly killed another officer, who was attempting to take him from his house.

D—— had always used alcohol to excess and had often got drunk. For eight or ten years previously his condition had been that of chronic alcoholism, with loss of affection for his family, of sense of decency in speech and conduct, and with frequent exhibitions of violence in word and deed in the house. He often attacked his wife, and for several years had been accusing her of infidelity without cause, mentioning the names of his personal friends in this connection and speaking in the most vile language before the family. Two years before he had been taken to the retreat for the insane, on account of his drink habits, and stayed there nine weeks. On his return, though free from drink, he acted queerly. He would go round the house searching everywhere, but without giving any reason. He wouldn't eat with the family, thought they had poison in the coffee, and for three months bought baker's stuff and ate it by himself out in the barn. He was a contractor and kept to his work, employing two or three men, but not being able to conduct his business properly, he contributed nothing to the family and spent what he earned in drink and debauchery. He drank as hard as ever. Finally his wife wanted to take him to a doctor. He was willing to go, but wanted to take his revolver with him, so they didn't go. He

frequently threatened to kill his family and himself, and finally his wife took out papers for commitment at the retreat, which was the occasion of the shooting. It is impossible to give more than an outline of this case, but examination showed that his act of shooting was not due to any delusions or hallucinations present, or to any deep clouding of consciousness. It appeared that he expected the legal summons, knew what it meant, knew what he was doing, and did at first refrain from shooting the policeman. The act was the outcome of his drinking, his ugly temper, and his determination not to submit to lawful restraint. From the medical point of view, D—— was evidently of unsound mind. He was a chronic alcoholic, with persistent delusions of jealousy and passing delusions of other sorts. He refused to his lawyer to allow the plea of insanity to be made and was sent to prison for three years, where he has showed no signs of insanity. Had the policeman died, the claim of insanity would undoubtedly have been pushed. My opinion to the court was that the man, though medically unsound in mind, was responsible for his act. There should not, however, be any difference made between medical and legal insanity, and that difference will be dropped if partial responsibility of the insane is an accepted doctrine.

In medico-legal cases, when the question of insanity is involved, the physician and the lawyer stand for two opposing interests, the interests of the criminal and the interests of the State. The lawyer prosecuting for the State holds the criminal fully responsible, unless he is so deeply insane that he does not know the nature and quality of his act and that it is wrong. At the other extreme the physician holds that if any of his faculties are shown to be deranged, his whole mind is thereby weakened in such degree as to absolve him from all responsibility. Each has undoubtedly gone too far in his own direction. The physician in his study of the insane has too greatly ignored the question of responsibility, and has often sought to rescue the accused on trivial disturbances of mental health. The attorney has not sought to familiarize himself with the nature and evidences of mental impairment, and has

been too ready to execute a really irresponsible person. If the medical profession frankly acknowledges that the insane are by no means irresponsible, and that the degree of responsibility is a matter to be determined only by a careful investigation of all the facts, a long step will have been taken in the interests both of justice and humanity.

DISCUSSION.

DR. J. M. KENISTON (Middletown): Dr. Simpson's paper is very timely. The medical profession as a body not only needs instruction in psychiatry, but *should* be *interested* in it, just as the psychiatrist should be interested in all other branches of medicine. This will broaden all of us. Up to date it seems wellnigh impossible to interest in psychiatry the general practitioner, or specialists, except the neurologist. How seldom do we hear a paper on insanity at meetings of our state societies or the American Medical Association! At the meeting of the latter in June next, we find in the section on nervous and mental diseases only eight papers out of thirty-five. In this society we have three papers out of fourteen, which is better than the record of last year.

Dr. Simpson touches one branch of the subject—criminal responsibility. Perhaps next year he will favor us with a discussion of the equally important question of the responsibility of the insane in their other relations to society—as to testamentary and business capacity, etc. At the present time there are at least three thousand five hundred insane in our state hospitals and sanatoria, and an unknown number outside, who at least are on the border line, or in a state of incubation, so to speak. Questions are constantly arising from these latter cases, often involving litigation. There are about five thousand cases of tuberculosis in Connecticut, and what a stir is made about it, but we find that insanity—a more terrible disease—runs a very close second to it.

If we are to secure new laws, it is absolutely essential that the words used should be perfectly clear—the entire content containing nothing equivocal, or which might lead to different interpretations. The word "partial" seems to me an equivocal or ambiguous word. Roget gives the following equivalents:

Abstract Relations:

1. (Order)—special, proper, personal, characteristic, exceptional.
2. Intellect. (Formation of Ideas)—prejudiced, narrow-minded, warped. (Results of Reasoning)—inexact, one-sided, unreasonable, unscientific, indefinite, inaccurate.

3. (Sentiment and Moral Powers. Affections in General)—desirous, inclined to, partial to.

4. (Moral Affections. Moral Obligations)—unjust, unfair, unequal, unreasonable, immoral.

This amplitude and variety of meaning reminds one of the verdict of the church committee: "After carefully investigating the charges of immorality against Sister ———, we have found that she has been *comparatively* chaste."

Many know about the unexpected results in the Massachusetts liquor laws caused by the inadvertent interpolation of a semicolon. We need a law absolutely definite and impregnable. Would not some word other than "partial" be better?—as diminished, modified, incomplete, limited, or graduated.

For many years I, with many others, have believed that the words "insane" and "insanity" should be abolished. These words mean simply "unsound" and "incurability" and might as well be applied to men ill with any disease—as cancer; to animals, and even to the mineral and vegetable kingdom. We now know that trees have eyes. The old Romans applied the words "insanus" and "insanio" to both animate and inanimate objects. We do to-day. Witness, Danver's Insane Asylum, Worcester Insane Hospital, etc.

We know that "insanity," as used to-day, is not an entity; it rather is a collective term embracing many clinically, if not pathologically, distinct symptom-complexes, which we now call "psychoses." These psychoses are as much *diseases* as pneumonia, typhoid, meningitis, etc. In some of these there is complete irresponsibility. In other psychoses there is incomplete responsibility. Not only does the degree of responsibility vary with the different psychoses, but in different stages of the same psychosis (lucid intervals), and with different individuals suffering from any given psychosis. Perhaps, some day, we may discover a measure of responsibility, as we have for heat and weight and fatigue. The researches of Professors Dodge, Munsterberg, Witmer, Scripture, and others inspire us with hope.

At any rate, using the word as now accepted, the insane man is a *sick* man. He has a disease, and this disease is not purely *mental*; it also involves the body. The mind is a part of the body—the highest and best part—but still a part; and the body is a part of the mind. Both suffer together in any sickness, although in different degrees. Responsibility then is affected more or less by disease, like any other faculty or function, and hence the question whether or not a given person is irresponsible wholly or in part is to my mind a purely medical question; as much so as the condition of the urine, or blood. Hence, medical men should be allowed to give *direct* evidence regarding the mental capacity of any alleged unsound person in either criminal or civil suits, just as they would if it were a case of fracture, or as

mechanical experts would in a case involving the tensile strength of steel, or the manufacture of alcohol. We should then be able to abolish the interminable, often sophisticated, and always absurd hypothetical question. Our profession should unite in an effort to have suitable laws covering cases where an indicted person pleads insanity. In Vermont, such persons are ordered into the custody of the Vermont State Hospital for the Insane, to be there observed and detained until the further order of the judge, so that the truth or falsity of such plea (of insanity) may be ascertained (Vt. Statutes, Acts of 15th Biennial Session). In Maine, New Hampshire and Massachusetts similar action is taken. It certainly seems a simple common sense proposition to place any person, criminal or not, who is suspected of, or claimed to be insane, under the care and observation of men who make psychiatry their life work. Other specialists, outside of institutions, could also be selected to watch the case, and this would be desirable in exceptional cases.

I heartily agree with the reader in approval of the Fowler bill regulating expert testimony. I hardly see why we should establish a ten-year limit in cases of homicide. The sentence should be indefinite, and no homicidal or dangerous insane man discharged unless recovery has been established beyond a doubt by a competent commission.

Will not our Society at this session take some action which will align us with the most modern ideas? Now is the time to make a beginning, when physiology, chemistry, psychology and psychiatry are working together to gain a more thorough knowledge of the normal and abnormal mind and body.

DR. W. N. THOMPSON (Hartford): The importance of the subject of responsibility of the insane is attested by the consideration it has long received at the hands of physicians, medico-legal societies, and the courts. The differences of opinion about it, and the difficulties that attend the practical application of any rule, are emphasized in the lack of uniformity of procedure and standards of legal responsibility in the different States.

The impossibility of setting up any positive standard of disabling mental disease will continue to hamper the courts and medical profession, but recognition of the inadequacy of the criteria now employed, and the fact that the methods by which it is sought to determine or disprove alleged insanity before criminal courts are absurd in kind and application, will go far toward correcting a condition that has had much not altogether unmerited criticism.

Not only has the insanity plea been abused, but those actually insane have suffered from judgment by arbitrary standards.

It has been held in this state that if an individual has the capacity of a child of fourteen years, he may be held responsible—a standard

manifestly difficult of application, except in cases of retarded development or simple enfeeblement. In many States knowledge of the consequences of an act, with capacity to differentiate between right and wrong, makes the person amenable to punishment; the fallibility of this test has been abundantly shown in institutions for the insane where a large proportion of the cases gave unmistakable proof of ability to distinguish between right and wrong. Knowledge of the consequence of the act appears in cases where premeditated murders have been committed and plans for escape as well conceived and carried out by those undeniably insane as could have been done by any sane person. Such persons, though in danger of legal responsibility, cannot by reason of the effect of disease be held fully responsible by medical standards. That many may not be held partly so would be difficult to prove to any mind. The essential disabling factor, loss of self-control in some degree, caused by the malady, is made subordinate to the ability to reason on the abstract difference between right and wrong; the legal test of insanity may therefore be a stumbling-block over which justice miscarries.

It is not a far cry to the time when irresponsibility was denied to any, and insanity was looked upon as demoniacal possession; precedents that crystalized out of the early ideas of insanity have not generally yielded to keep pace with the fuller knowledge of the disease. There has been, however, within the last decade, evidence of a very promising tendency in some of the smaller States, as well as the newer States, to accept the medical view of partial responsibility, and also to grant wider latitude to judges in determining the degree of responsibility. In Vermont persons held for trial on criminal charge, for whom plea of insanity is made, are committed to the State Hospital for observation, and in New Hampshire partial responsibility has been recognized by the courts. The apparent discrepancies in the opinions of experts has stood in the way of progress, but these differences are rather apparent than real and are usually the result of unfortunate conditions under which testimony is given. There is, as a matter of fact, little difference of opinion among psychiatrists with reference to this question. In the lay mind, however, there is difficulty in squaring lack of power of self-control in a person, with his apparent capacity to get on as well or better in his environment than his neighbors who are held to be fully responsible. Partial insanity has been urged in defense of overt acts of these lopsided individuals, just as though the mind were like a bad orange—a portion of which might be diseased and the remainder, for the time being at least, sound. If the study of mental diseases teaches anything, it is that a person who suffers impairment in any one faculty exhibits in due course weakness in all; there is not, therefore, responsibility in any sphere, but rather partial irresponsibility. These border-line cases are subjected to unfair hazards when tried and

•

judged by the methods usually employed. Examination by an impartial board of experts that shall render an opinion to the presiding judge, is a method that has had favorable consideration and bids fair to be adopted in some States. Need of some such modification of methods now in vogue is rendered rather imperative by reason of the recognition by psychiatrists of morbid mental states that do not necessarily eventuate in frank attacks of insanity, and do not, as noted by Dr. Simpson, ordinarily necessitate placing the person under restraint, in fact, do not greatly impair his capacity for business or for any vocation; with these should be included the defective whose weakness finds expression in the impulse to burn, steal, drink, etc., and the victims of the various phobias who mingle and take part in the social and business world, where they may display unusual acumen, yet by legal standards of responsibility are held accountable. For all of these the question of attenuated, graded or partial responsibility is of great importance, and it is only slightly less so to the social body at large.

Whether responsibility is a quality that lies within or without the individual, it plainly stands for his ability to get on in his environment without working harm to the community or to its individual members. It is preëminently a quality that is evolved of education and experience, and while it exists in every degree normally, from the hair-trigger temperament to thoroughgoing self-control, it is bound to recognize the rights of others and to exercise inhibitory control upon instinct and passion. That it is entirely destroyed while other faculties remain practically intact is not in keeping either with common sense or experience.

DR. FREDERICK T. SIMPSON (Hartford): As has been indicated just now, Connecticut is behind the other New England States in reference to the treatment of people who allege insanity in defense of their crimes. It seems to me that it is desirable that we should move forward. You may not be so much interested in this particular form of insanity, but you have all acted as medical experts in other lines. The reference is to medical experts in every line of work, as I said when I mentioned one or two provisions of the bill gotten up by the State Bar Association and State Medical Association of New York. It provides for ten physicians in each judicial county of the State, to be paid by the court, and no other person.

It seems to me that the members of the Society generally are interested in having some reform in our method of calling experts in medico-legal cases of all kinds, and I should like to make a motion to the effect that a committee of five be appointed by the Chair to endeavor to secure coöperative action with the Connecticut Bar Association to modify procedure in medico-legal cases.

MEDICAL PAPERS

Hemolysis in the Diagnosis of Malignant Neoplasms.

HAROLD SEARS ARNOLD, M.D., NEW HAVEN, CONN.

The reason for presenting a paper on hemolysis, a subject which on first thought seems of greater scientific than practical interest, is to bring before you briefly some of the work which has been accomplished along this line, and to determine, if possible, from a perusal of the literature and from such personal experience as has been possible in a short time, the value of the test to the clinician, particularly in the diagnosis of malignant growths.

The enormous amount of study which has recently been devoted to cancer has naturally resulted in attempts to find changes in the blood diagnostic of the neoplasms. Much of this work has created enthusiasm with attendant literature when first brought to the notice of the profession, but has subsequently been forgotten. The staining methods of Ehrlich gave rise to attempts to demonstrate morphological changes in blood cells supposedly pathognomonic of the presence of new growths. A little later came somewhat more valuable studies in regard to the resistance of red blood corpuscles to anisotonic solutions of sodium chlorid. Donati showed that the resistance of the red blood corpuscles of cancer patients was increased in 80 per cent. of the cases and that this increased resistance was especially marked in cases so far advanced that marked cachexia was present. Lang found that the resistance of red blood corpuscles to hypoisotonic solutions of NaCl was increased in cancer, but that the same thing was also true in cases of infectious disease and icterus. Other investigators have found other changes in the blood of cancer patients, none of which are pathognomonic. For example, Grawitz and Boas investigated the specific gravity and found it to be reduced.

Von Jaksch demonstrated diminution of the albumin, Wendelstadt lessened nitrogen, Rumpf, Klemperer, and Von Jaksch decreased alkalinity, Freund increased sugar, and Moracjewski that chlorine was increased and phosphorus diminished. Next came studies in agglutination by Ascoli, Grünbaum and others. Engel was among the first to investigate the specific substances which appear in the blood of persons suffering from cancer. He injected guinea pigs with 10-15 c.cm. of serum from cancer patients' blood on two occasions. He then investigated the effect of the precipitins of the animals thus prepared upon the serum of the two patients from which the original blood came, upon other carcinoma cases, and finally upon the serum of human beings in health. He found that the precipitating, the agglutinating and the hemolytic power of the less cachectic cancer cases was more marked than that of those more advanced in the disease.

Studies in hemolysis were now begun. Kelling, v. Dugern, Fischel and others studied the effect of cancer blood serum on the corpuscles of the lower animals. Fischel, using the red blood cells of chickens, found an increase in hemolytic power of cancer serum over the normal in 50 per cent. of cases, but that the reaction was also increased in diabetes, pernicious anæmia, endocarditis, and tuberculosis. Weil, working with human corpuscles, also found that the reaction was not specific for cancer. The same author, working with dogs suffering from lymphosarcoma, found that the reaction of their serum against the corpuscles of normal dogs was much more uniformly hemolytic. These findings, together with the discovery that extracts from benign tumors caused no destruction of red blood corpuscles, while extracts of malignant new growths uniformly dissolved the cells, gave fresh interest to investigations of the action of blood serum of persons with various diseases, especially cancer, against normal and abnormal red blood corpuscles.

Hemolysis, or more properly hematolysis (*αἷμα*, blood, and *λύσις*, solution), as the word etymologically indicates, means the solution of the blood. In common usage, however, we under-

stand by hemolysis the freeing of the hemoglobin which is loosely associated with the plasma of the red blood cells, and which readily diffuses, leaving the envelopes as so-called "blood shadows," pale, almost invisible, and prone to disintegrate. The thin and delicate covering of the red cell is easily worked upon by thermal, physical, and chemical changes to such an extent that the hemoglobin is entirely, or in part, diffused through the serum. The agents causing hemolysis are termed hemolysins. They form a large group which may be roughly classed as inorganic and organic. In the former class are a large variety of salts, soaps, alkalies, etc., substances which change the isotonicity of the blood serum, but which interest us only as they are to be avoided in carrying out hemolysis tests; in the second are those of greater interest to us, namely, normal blood and tissue juices of the same or of alien species, and those of certain pathological states.

It has been known for some time that the blood serum of one species of animal, when injected into the vessels of another, may do damage to and even kill the latter through a rapid separation of the hemoglobin from the red blood corpuscles. This fact naturally brought to an abrupt end the idea of transfusions of alien blood.

It has been found that the blood serum of some patients with pneumonia, with pernicious anæmia, and with certain other diseases, when mixed with the red blood corpuscles of a normal individual will give rise to hemolysis. If, then, this hemolysis occurs, why is the patient's blood not rapidly destroyed and the patient killed? Bordet in his experiments found that many factors enter into the problem. He sought to ascertain whether the blood of one animal might not be immunized against hemolysis by repeated injections of the blood of a second animal, just as bacteria or toxin-destroying power can be induced in animals by repeated injections of bacteria or their products. It was found that when a few c.c. of defibrinated rabbit blood was injected daily for five or six days into a normal guinea pig, and when, at the expiration of that time, the pig's blood was drawn and the serum allowed to separate

from the corpuscles, that this serum was markedly hemolytic for rabbits' corpuscles, but that this power did not extend to the red blood cells of alien species. Bordet now attempted to ascertain the nature of the substance or substances which the repeated injections of the rabbit blood had caused to appear in the guinea pig's serum. By heating the lytic serum for half an hour at 56° C. he apparently destroyed the lytic power. The addition of a small amount of normal guinea pig serum, not in itself lytic, caused the heated serum to regain its lytic qualities forthwith. In other words, the dissolving capacity of this artificially lytic serum is due to two distinct substances; one of these, the one which results from the adaptation of the animal to the alien blood, is stable at 56° C. and is termed the immune substance or immune body, and the other, which is present in normal serum but which is rendered inert at 56° C., the alexin. The immune body and the alexin are capable of separation.

There are substances, therefore, elaborated in the body which render reactions *in vivo* different from those *in vitro* and which render the problem not a simple but a complex one.

According to Crile the practical medical importance of the hemolysis test in regard to the diagnostic value in cancer cases lies in the answers to the three questions: Is there a reliable technique for the determination of hemolysis? Are these changes in the serum and corpuscles of a specific nature? Are these changes constantly present? To these might be added, Is the conducting of the hemolysis test within the powers of the average laboratory worker?

Crile's published results would lead us to answer the first three questions in the affirmative. Weil, on the other hand, displays far less enthusiasm, although his results show that the test in cancer cases is not without considerable diagnostic value.

As far as the carrying out of the reaction is concerned, there is no reason why any man of average ability, if he can use care in regard to detail and is endowed with power for accurate observation, cannot perform the reactions. Very

little apparatus beyond the ordinary laboratory equipment is required. The following articles are in use for this work at the laboratory of the New Haven Hospital: a water bath, with thermometer, an incubator, an ice chest, large and small test tubes, with racks, glass beads, pipettes, and four 30 c.c. Luer glass syringes. All instruments and containers, rendered chemically clean and sterilized, are rinsed with sterile physiological saline directly before use. The patients from whom the blood is taken for the tests and the controls are prepared as for blood culture. The ward nurse scrubs the bend of the elbow with soap and water and applies a bichloride pack an hour before the blood is to be collected. Permanganate and oxalic are usually dispensed with and baths of sterile water, alcohol and ether precede the introduction of the needle. An Esmark bandage around the upper arm will usually bring the median basilic vein into prominence. The pain of puncture is so little that any local anesthetic is usually unnecessary. If the patient is nervous an ethyl chlorid spray may be used. The blood will usually press back the plunger of the syringe as soon as the needle reaches the lumen of the vein. From 20 to 25 c.c. of blood is then drawn. After the required amount of blood has been collected the needle is withdrawn, the vein compressed, the bandage removed, and the place of puncture sealed with a drop of collodion. Of the blood, 5 c.c. is placed in a tube containing glass beads and is shaken by the nurse until the fibrin settles out on the beads, leaving the serum and corpuscles. The remainder is placed in rather narrow test tubes and set at rest in the ice chest as soon as possible to cool and clot. Wherever possible the corpuscles for the reaction and the controls are collected just before the test is set up.

Small test tubes of about 75 mm. diameter are employed. These rest in a rack holding 32 tubes, each place numbered. Just before using, all tubes are carefully washed in sterile physiological salt solution. In recording, the blood to be tested and the three controls are marked S (serum)A, SB, SC, SD, and C (corpuscles)A, B, C, D, and as each mixture is made, its position in the rack is noted on a card.

Thus: 1 = SA + CA
2 = SA + CB
3 = SA + CC
4 = SA + CD
5 = SB + CA
6 = SB + CB
7 = SB + CC etc.

The clear serum having been pipetted off, .5 c.c. of each, according to schedule, is placed in the proper tube. An equal volume of the different corpuscles, suspended in .85 per cent. isotonic salt solution, is added to the proper sera. Where the amount of material permits and when tuberculosis is suspected, duplicate sets are made and subjected to a temperature of 55° C. in a water bath for ten minutes. These are placed in the ice chest for a few minutes before being incubated with the original set. Both sets are now placed in the incubator for two hours at 37½° C. At the expiration of this time the results are read off by an unprejudiced person and recorded on the card upon which the plan of mixture is recorded.

A test is regarded as positive when the supernatant fluid is colored pink or red by the hemoglobin in solution, negative when the corpuscles on sinking to the bottom of the tube leave the fluid above a clear pale straw color. Where the reaction is slight the sediment should be searched microscopically for "shadow corpuscles." A reaction is termed "reverse" when instead of the diseased serum acting upon the normal corpuscles, the normal serum acts upon the diseased corpuscles.

The larger part of the work on hemolysis has little bearing upon clinical diagnosis. Work recently offered by Weil and Crile of this country, and by other observers in Europe, indicates that hemolysis may be profitably employed as a laboratory method in a field where it should be eagerly welcomed; *i.e.*, in the early diagnosis of malignant growths. Whether the technique by Weil is less perfect than that employed by Crile, or whether it is a matter of chance, it is hard to say, but the fact remains that the results of the former are less convincing as to the infallibility of the method than those of the latter.

In twenty-nine cases of carcinoma investigated by Weil, eighteen showed positive hemolysis. Of the remaining cases the cancer corpuscles were attacked by the serum in two cases. In eleven cases the reaction was negative. Of these eight were early and three late. In diseases other than cancer, out of thirty-seven cases tested, seven were positive; one pneumonia, two joint tuberculosis, one in syphilis, one in gout, one in fibroid of the uterus, and one in chronic mastitis. The reaction was negative in six normal individuals.

Early in 1907 Crile reported hemolysis tests upon 125 normal individuals where the results were uniformly negative. Ascoli published his findings in 114 persons, ninety-seven of whom were diseased. He found the normal sera to be non-hemolytic as a rule. He found, however, that a positive hemolysis was present in three cases, one of pneumococcus, one of tuberculosis, and one of pneumonia. Eisenberg found hemolysis in the majority of typhoid, scarlatina and syphilis cases. His results in typhoid disagree with those made by us. Of the seven typhoids used in our reaction as controls, none showed hemolysis.

Crile cites eighty cases of cancer in which 80 per cent. showed positive hemolysis. His tests on patients with benign tumors were negative. In the cases of tuberculosis, those showing hemolysis showed autolysis as well, thus giving a characteristic reaction. He found no instance of hemolysis in chronic suppuration or acute infection. In the 20 per cent. of cancer cases that showed no hemolysis, all but one was either inoperable or very far advanced. There was but one negative reaction among the early cases. Crile cites several cases in which the hemolysis test was of diagnostic value. In a case of slowly developing bone tumor the reaction was negative. Operation showed osteomyelitis. A routine hemolysis in a case supposedly fibroma was positive. The section showed malignant neoplasm. In several cases of breast and gastric tumor the test coincided with the malignancy or non-malignancy of the tumor as proven by section.

Rosenbaum examined the hemolytic action of the blood serum of seventy patients, including twenty-six with certain cancer. His results were so favorable that he urges the use of hemolysis as a diagnostic aid.

Crile's technique, which is essentially the one employed in the cases to be reported, is comparatively simple. Results of his work published in December of last year are the following:

		Hemolysis
Normal subjects	211	0
Pyogenic infections	71	7
Benign tumors	55	0
Cancer	153	130
Post op. cancer cases with clinical recurrence.....	11	11
Post op. cancer cases without clinical recurrence after 3 weeks to 15 years	37	0
Tuberculosis	52	48

He observes that cancer cases showing no hemolysis are in an advanced and inoperable stage. Only occasional early cases fail to show hemolysis. Cancers on mucous membranes show hemolysis more frequently than cancer in tissue or in breast.

All cases of tuberculosis show reverse hemolysis; *i.e.*, normal serum hemolyzed the patient's corpuscles. Heating serum to 55° C. for ten minutes prevented hemolysis.

Plasma obtained by immediately centrifugalizing the blood showed little or no hemolysis in hemolytic cases.

The hemolytic property reaches its maximum about twenty-four hours after the blood is drawn.

In cancer, groups in which the disease was entirely removed lost their hemolytic quality in from twelve to twenty-one days after operation. In cases in which incomplete operation was performed, the hemolysis continued indefinitely.

Crile concludes that hemolysis occurs in a number of diseases. It occurs with great frequency in cancer and tuberculosis. The reaction in tuberculosis is the reverse of that in cancer; *i.e.*, in cancer, the cancer serum acts on normal corpuscles, while the tuberculosis corpuscles are acted upon by normal serum. From a clinical standpoint hemolysis offers

additional evidence which may be used in the diagnosis of cancer and tuberculosis. This evidence is not as yet specific.

The following is the table of fifty-three hemolysis tests performed at the New Haven Hospital since January 1, 1909. Each test was done with from two to three controls.

Malignant tumors:

Proven either by section after operation or autopsy.

Clinical diagnosis.	Pathological diagnosis.	H.
1. Carcinoma of breast	Carcinoma (op.)	pos.
2. Carcinoma of uterus	Adenocarcinoma (hysterect.)	pos.
3. Carcinoma of uterus	" (curette)	pos.
4. Cancer of stomach	Cancer (autopsy)	pos.
5. Cancer of ascending colon	" (op.)	pos.
6. Cancer of breast	Scirrhus (op.)	pos.
7. Epithelioma of auditory meatus..	Epithelioma (op.)	pos.
8. Adenocarcinoma of prostate....	(op. and autopsy)	
metastases in bones	Adenocarcinoma	pos.
9. Cancer of head of pancreas,		
metastases in liver	(autopsy)	pos.
10. Cancer of ascending colon	(op.)	pos.
11. Cancer of stomach	(op.)	neg.
12. New growth of thyroid with		
metastases causing spontaneous		
fracture of tibia, unproven.....		pos.

Tumors diagnosed clinically but unproven:

Tumor of brain	neg.
Hypernephroma of left kidney	neg.

Benign tumors:

	Diagnosis by section.	Pos.	Neg.
Fibroid of uterus (3)	Fibroid	0	3
Adenocystoma of breast (1)....	Adenocystoma	0	1

Reverse hemolysis:

	Reverse.
Atrophic cirrhosis (with icterus), autopsy	1
Tuberculosis and diabetes	1

Various diseases used as controls:

Various diseases used as controls.		Pos.	Neg.
Acute rheumatism	(3)	0	3
Chronic rheumatism	(2)	0	2
Lobar pneumonia	(3)	1	2
Typhoid fever	(6)	0	6
Chronic endocarditis	(4)	0	4
Cerebral hemorrhage	(2)	0	2
Chronic nephritis	(4)	0	4
Tuberculosis of lungs	(1)	0	1
Furunculosis	(1)	0	1
Osteitis deformans	(1)	0	1
Streptococcus joint	(1)	1	1
Coal gas poisoning	(3)	0	3
Cerebrospinal meningitis (diplococcus) ..	(1)	0	1

The lack of material prevents the drawing of the conclusions possible to Crile, but the results here given do not differ materially from his.

Of thirteen malignant tumors, twelve gave positive hemolysis.

Four benign tumors gave negative tests.

Of thirty-two cases of acute and chronic disease one only, a case of acute lobar pneumonia, gave a positive; the others were uniformly negative.

It is safe to conclude, therefore, that while not infallible, the test occurs in a sufficient number of cases to render it a valuable aid in the diagnosis of malignant growths.

In the three cases of gas poisoning tested the reaction was undertaken preparatory to transfusion. Although the centrifugated plasma was not tinted and no hemolysis occurred after incubation in our cases, the test is of little value because of the number of hours necessary for the "ripening" of the serum, time which the subject for transfusion cannot waste.

DISCUSSION.

DR. CHARLES J. BARTLETT (New Haven): This application of hemolysis to the diagnosis of tumors opens up a very interesting field. We know how delicate the hemolytic test has proven to be in other fields than this. If further tests show it to be reliable, I feel that

it offers a very delicate means of testing for malignant tumors. When we compare Crile's results with those of Weil, we find discrepancies. Weil had a much smaller percentage in which the reaction was positive in cancer than did Crile. Because of the discrepancy in their results I am particularly interested in Dr. Arnold's paper.

One point brought out by Crile in his paper may be referred to, and that is that serum obtained immediately after drawing the blood did not contain the hemolytic substance to such an extent as it did after standing twenty-four hours. Apparently it is not something free in the plasma and the source of it has not been determined. Does it come from the leucocytes or the blood corpuscles, or is it a ferment action? Also, according to Crile, this reaction disappears in twelve to twenty-one days after the tumor has been removed. This shows how quickly acquired properties may disappear from the blood. I believe also, according to Crile, that in cases of recurrence this reaction, which had disappeared, again becomes evident. When the operation is incomplete, the reaction fails to disappear.

It is interesting to consider what relation there is between this hemolytic substance and the anæmias in these diseases. According to test tube reactions the serum has no hemolytic effect on the red corpuscles of the patient; whereas, it will destroy normal corpuscles. It is impossible not to surmise some connection between the anæmia which is so common in cases of malignant tumors and the hemolytic action.

DR. GEORGE BLUMER (New Haven): In regard to the remarks of Dr. Bartlett that two separate changes occur in the blood in carcinoma—one the property which the serum acquires of dissolving red blood corpuscles, and the other the resistance that the red blood corpuscles acquire to the action of the serum—I would say that it is the property of the serum to dissolve red blood corpuscles that is being investigated. The resistance of the red blood corpuscles has not been investigated to anything like the same extent, and would bear further investigation.

It is also perfectly evident from what Dr. Arnold has said that this property of hemolysis in the serum of carcinoma patients is not specific, or limited to carcinoma. He has mentioned a variety of other diseases in which the blood serum acquires this property of splitting up blood corpuscles. From the clinical standpoint, the important question is whether any of these diseases are ones likely to be confounded with carcinoma. If it is merely a matter of pneumonia or sepsis, there is very little opportunity for confusing these diseases with carcinoma. In looking over the literature, I think that there are certain conditions that are likely to be mistaken for neoplasms in which there is increased

hemolysis. Take pernicious anæmia, for instance. It is sometimes difficult to differentiate between this and latent carcinoma of the stomach. The various experiments cited by Dr. Arnold show that in some cases of pernicious anæmia there is an increased hemolysis; so that probably this hemolytic test would not aid us in differentiating pernicious anæmia from cancer of the stomach.

Quite a number of authors have also described increased hemolysis in syphilis. It is difficult to differentiate gummata of various parts from neoplasms. There, again, the test would be of little value; but it is safe to say that, on the whole, the diseases other than carcinoma that lead to increased hemolysis are not likely to be mistaken for new growths. There seems to be considerable hope that the test will be of great value in the diagnosis of carcinoma.

As to the different results obtained by different workers in this field, those of Crile being much more optimistic than Weil's or those obtained by Blumgarten or the younger Janeway, it seems that they are due to differences in the technique. Blumgarten and Janeway criticise Crile's technique, and state that he did not use measured quantities of red blood corpuscles but the whole blood, as a unit. There are differences in the blood in different cases, marked anæmia having very different blood from normal blood. Another point in Crile's technique that is criticised is the use of natural sedimentation instead of centrifugation; so that it seems to me a question whether Crile's remarkable results are not partly due to his technique, and whether his technique is not open to a certain amount of criticism.

To sum the matter up, however, it appears to me that we have here a test that will probably prove to be of a good deal of value, if correlated with the other findings of the case—the clinical history and the physical signs. Like all other laboratory tests, it may be used as a link in the chain. There is a strong tendency at the present day to look for specific tests and signs; but we do not get these, except in very few diseases. We must get out of the habit of looking for specifics, and correlate all the links in the diagnostic chain, so to speak.

DR. HAROLD S. ARNOLD (New Haven): Weil, in his experiments, used only one control; whereas Crile used two or three. This may have had some effect in producing the difference in their results.

The Influence of the Thoughts and Emotions in the Causation of Disease.

SAMUEL D. GILBERT, M.D., NEW HAVEN, CONN.

He is the wiser, master doctor :

He is a curer of souls, and you a curer of bodies.

—*Merry Wives of Windsor.*

From that night forth, the natural functions of my body began to be vexed and impeded, for I was given up wholly to thinking of this most gracious creature: whereby in short space I became so weak and so reduced that it was irksome to many of my friends to look upon me.

—DANTE, *Vita Nuova.*

If Dante so sang of the effect of love, how potent may be other emotions and thoughts common to man and productive of ill health. The influence of the thoughts and emotions is mentioned in literature continually. Fear is portrayed, as when in "Richard II" the Duchess says:

Yet am I sick for fear.

I am surprised with an uncouth fear :

A chilling sweat o'erruns my trembling joints.

—*Titus Andronicus.*

Sorrow :

But now will canker sorrow eat my bud,
And chase the native beauty from his cheek,
And he will look as hollow as a ghost,
As dim and meager as an ague's fit,
And so he'll die: and rising so again,
When I shall meet him in the Court of Heaven,
I shall not know him: therefore never, never, must
I behold my pretty Arthur more.

—*King John.*

Sorrow concealed like an oven stopp'd,
Doth burn the heart to cinders where it is.

—*Titus Andronicus.*

Excessive grief finds mention in several plays :

The grief that does not speak
Whispers the o'er fraught heart, and bids it break.
—*Macbeth*.

Envy :

As lean faced envy in her loathsome cave.
—*Henry VI*.

Advanced above pale envy's threatening reach.
—*Titus Andronicus*.

Lear mentions hysteria, as

Hysterica passio, down, thou climbing sorrow,
Thy element's below.

Avarice :

The aged man that coffers up his gold,
Is plagued with cramps, and gout and painful fits.
—*Lucrece*.

I might go on quoting from numerous writers who depict the ill effects on the physical man of hate, remorse, worry, lust, etc., not only "The Immortal Bard" but Scott, Thackeray, Massinger, Maupassant—notably in his beautiful short story, "The Piece of String," in which he depicts wonderfully death following a long period of wasting away due to suspicion of theft falsely entertained—Tennyson in "Launcelot and Elaine," Goethe in "Faust," and many others. One of the gems of very recent date depicting the effect of grief is the "Transformation of Lachlan Campbell," in the "Bonnie Brier Bush," by Ian McLaren.

Our present environment as a nation is largely and chiefly responsible for the prominence of mental conditions as a factor in the etiology of disease to-day. When I began the practice of medicine nearly forty years ago, life was far simpler, even in our cities. The telephone came into general use thirty-four years since. Prior to that day, all that the doctor had to do, when he started on his calls, was to hang out his slate, and the patient must wait until he returned, unless he could ascertain

by inquiry where the doctor was; and the latter was not annoyed by useless inquiries. How is it to-day? We are constantly being interrogated by telephone, and often wearied and annoyed thereby, and we must submit to it patiently if not cheerfully, because its use is indispensable. This, however, is only one thing which contributes to our present condition of life. Forty years since there were no electric cars, no eighteen-hour trains between New York and Chicago, no four and a half day transatlantic steamships, no wireless telegraphy giving the voyager the quotations of the stock market in mid-ocean or bringing him news of some dire disaster, and no Sunday papers of great importance. To-day the tired man or woman at home cannot, if the daily papers are read, escape, on rising refreshed in the morning, having spread before them all the dreadful disasters and scandals from Melbourne around the world to New York and back again; and if they flee and make their beds in the "uttermost part" of the woods of Maine in a fishing camp, there will the telephone pursue them. Automobiles, while of the greatest use and now almost indispensable for business and pleasure, nevertheless add to the spirit of rush and nervous excitement which prevails. They tear through our city streets and rush over our country roads as John Hay describes the runaway in his poem "Little Breeches"—"Hell to split over the prairie went team, Little Breeches and all"—endangering life, and occasionally maiming and killing people, with as little thought by the owners as had the drivers of the horses and chariots in the French Revolution.

This prominence of mental conditions owing to our present way of living is so marked in all the walks of life, that it is difficult to treat it fully in a single paper. All the new inventions and adjuvants in business not only *per se* make life more strenuous, but with the competition in business and professional life, cause a spirit of rush and whirl and nervousness, which becomes, as it were, a second nature. The year and more which preceded the inauguration of our present national administration was so fraught with uncertainty and depression

in the United States, particularly in business life, that men were unable to know their present financial status, or plan for the future. What wonder that the population of our insane asylums increased, or that suicides were frequent; and in prosperous days now returning, the rush is so great to make money, and make it quickly, that something goes wrong with the nervous systems of the financiers daily. Of this condition of affairs Samuel Hopkins Adams,¹ writing on "Why Theaters are Vile," says:

It is on the neurotic side, I am convinced, that we shall find in part an explanation of the present dramatic tendency. New York is a city of abnormal and unhealthy nervous tension. The New Yorker works keyed up to a strained pitch. After work comes the revulsion, the whole psychologic being droops, nervously the man is spent and flaccid. If you will track the average "man of affairs" after he leaves his business, you will find him making an alcoholic progress uptown from bar to bar. This does not mean that he is getting drunk. It means simply that he is striving to bring his depressed and fagged out nerves up to the concert pitch at which the normal person lives. After dinner, he is ready for amusement. Often it is gambling, the excitement of which keys him up, or it is the theater. Of this he says, "I don't want to see anything that makes me think. I'm too tired. Let's take in something with go to it." What he really and unconsciously means is not really that he is too tired to think, but that he needs a mental cocktail; something that will spur his jaded nerve centers up again. Shock will do it, the appeal to the sensual and the animal within him will do it. Hence the success of the prurient drama, amidst a theater-going public largely composed of sufferers from depressed nerves.

Now I do not believe that the average business man in New York City is a drunkard or a gambler, as Mr. Adams implies, or prefers nasty to clean plays. His narrative leads me to believe that Mr. Adams's acquaintances in the business world must be of a low type, but this statement does show the stress of the battle which the business world is fighting. This tumultuous activity is seen in our sports and pastimes as well as in business. We Americans do nothing by halves, and we are not slow here, as evidenced by the energetic youth, who rush over the mountains "on time" during the vacation period, thereby causing troubles of the heart and other ailments. The

¹ *The American Magazine*, May, 1909, p. 46.

latest craze is the Marathon race, and now we hear of the dance of the same name. This long-distance running is disastrous in its effects even upon professionals who are trained for it; but how much more so, even with fatal results, as in several instances, among amateurs. This is the sequel of rivalry and emulation which terminate disastrously to the physical man.

Under the subject of this paper will naturally come our present environment with reference to the servant question. It is my experience and yours as well, at least of those who like myself are general practitioners, to find that one of the greatest worries and causes of ill health, particularly of the nervous system, among women, is this servant question. It is like a widespread disease. We must have servants, and the great thing is to get good ones, and keep them when we get them; and this process is enough to tax the patience of our wives, and wear them out, into the bargain. I hear this complaint over and over, particularly among those who keep one servant, "Oh, if I could only get a good girl to do my work!" If some general relief for this difficult problem could be found, it would add greatly to the sum of human happiness.

How do the thoughts and emotions influence the causation of disease? Achorn² says that

. . . a sound body waits on a sound mind, and the material for repair of the nervous system is furnished by the digestive tract. The converse of this statement has long been known to be almost equally true. The mind, acting through the vasomotor and sympathetic system, affects the secretions of the internal organs, the stomach and bowels; it acts on the kidneys, and the heart, on respiration and perspiration; and influences the amount of blood flowing through the arteries. Digestion may be hastened or retarded by the condition of the mind, and the assimilation of food and the removal of waste products may be disturbed to the extent, that if a state of unrest or unhappiness obtains, such as may be occasioned by worry, sorrow, anger, or depression from whatever cause, a loss of balance between the body and mind follows, even though the body is sound. All this results in unnatural and unhealthy conditions for both. In a word: an unhealthy mind reacts deleteriously on an otherwise healthy body.

² "Religion and Medicine," p. 389.

The most direct influence of the thoughts and emotions is on and through digestion, nutrition, and sleep. When does this influence begin? At birth. The infant is a little animal, but almost the first individual impressions which are made upon him are evidenced by the thoughts and emotions. This is well portrayed in Holland's "Bitter Sweet":

How does the manikin feel his way
Out from the shore of the great unknown,
Blind and waiting and alone, into the light of day?
What does he think of his mother's eyes,
What does he think of his mother's hair,
What of the cradle roof that flies,
Forward and backward through the air?
What does he think of his mother's breast,
Bare and beautiful, smooth and white,
Cup of his joy and couch of delight?

How quickly the baby shows jealousy, crying if the mother does not give him her undivided attention; determination to have his way, by crying to be "taken up," and refusing to go to sleep unless carried; fear of falling, as evidenced to the mother holding him on her knee—"what every woman knows"—fright at sudden noises and bright lights. Here at the very threshold of life is the opportunity to mold character, to guide the will, to promote self-reliance, to teach submission to a higher power, obedience and courage. The importance of a wise, kind, but firm nurse cannot be overestimated, even at the very beginning. One who, instead of taking up the baby when he cries, turns him gently and patiently until he finally goes to sleep, is not merely conferring a blessing upon the parents by preventing night-shirt parades on their part, but is so influencing the child by teaching it peace and content with its surroundings, that it will grow up a happy, contented member of the household and society. If these lessons are not taught thus early, a nervous, excitable child is produced, the neurotic man or woman, one of the most deplorable conditions which we have to treat.

If we would drive out hurtful thoughts and emotions, we should cultivate the opposite; and this cannot be begun too

soon in life. We hear and know of maternal impression before birth; and how important it is that the surrounding atmosphere of the babe and young children should be in every way conducive to health, not merely the physical environment, the room with its furnishings, the pictures, etc., but the mental and moral atmosphere as made by the parents, low tones of voice, and pleasant words and sounds. Have you noticed how fixedly a child of one year will look at you, or an object which is presented to its view, how suddenly it will tremble or cry at a movement or sound which frightens it? Hence, as children grow up to youth and adult life, they should breathe an atmosphere of courage, joy, peace, kindness, generosity and altruism, so filled with thoughts and emotions which evidence their possession that there will be no room for their counterparts to gain a foothold.

I am not writing a paper on the nurture of children, but I am dwelling on this part of my subject because I believe that if more attention were paid to the cultivation of the ideas I mention, we should have gone a long way toward making a healthy and happy man or woman. "As the twig is bent, the tree inclines," and with or without the twig, "the child is the father of the man." What are, then, some of the emotions which cause disease?

First—Fear; because this runs like a baneful thread through the web of our life from beginning to end, and often our mothers breathed the same for weeks before we were born. Fear, as Dubois³ says, "springs from the fact that within certain limits it is an eminently useful emotion. It is the cry of alarm uttered by the sentinels, the instant they perceive the approach of danger." Fear makes one alert and watchful of impending evil, deters from immorality and sin, because of the disgrace or penalty which ensues; from doing anything which will injure the physical man, as, for example, from eating food thought to be injurious, from habits of intemperance, etc. It was a wholesome fear which made a patient in advanced years say, "I will do nothing, if I know it, which

³ Dubois—"The Psychic Treatment of Nervous Diseases," p. 149.

will in any way shorten my life, and I will give up any habit, or stop the use of anything which will injure me in the least degree."

Where the influence of fear is not salutary, we find its influence causative of disease.

"Where are you going?" asked an Eastern pilgrim on meeting the Plague one day. "I am going to Bagdad to kill five thousand people." A few days later, the same pilgrim met the Plague returning. "You told me you were going to Bagdad to kill five thousand people, but instead you killed fifty thousand." "No," said the Plague, "I killed five thousand, as I said I would; the others died of fright."⁴

De Foe's history of the great Plague or Black Death in London bears out this statement, for he says that while multitudes fell victims to it, more were killed by fear of it. We see this state of mind exhibited in many ways too numerous to mention, but I will note a few which are common.

Our patients are afraid of animals, dogs and cats, and this fear sometimes produces functional asthma and irregular heart action. Others are afraid in the dark, afraid to go to bed for various reasons, as, for example, because some relative or friend died of apoplexy in his sleep; afraid to go down town, or walk down a certain street, because they fear that they may be run over by an electric car or automobile. The professional or business man fears failure, the public speaker fears his audience. Middle life brings fear of poverty, and often ends in avarice, which is the vice of old age. One of the commonest fears is the fear of disease. A patient fancies he has organic heart disease, or that he has tuberculosis, or is impotent. He immediately gets into a nervous state and becomes worried over his pulse, his tongue, etc. At last he consults a doctor, who examines him, assures him that his fears are groundless, gives him comfort and courage, with, possibly, a prescription, and, having put it in his pocket, he goes away, forgets his ailment, quite likely the prescription, and recovers without it, or the Emmanuel Movement.

There is one fear which is growing in prevalence, viz., fear of bacilli. There are bad bacilli and good ones, but some of

⁴ Trine—"In Tune with the Infinite," p. 69.

our patients seem to think that they are all bad, and waiting on every corner to jump upon them. I had a patient, a highly educated man, who was actually afraid to have anyone cook his food but himself, was afraid to use any milk but condensed milk, would not buy a steak unless it was cut out of the middle of the section of beef, and finally was made ill from dysentery, because he had not proper food and worried about all he ate. I remember that Dr. Porter, ex-President of this Society, read a humorous poem at one of our annual dinners, depicting the death of a young man so worried about bacilli that he took to the woods and drowned himself.

There are certain diseases directly caused by fear, as, for example, paralysis agitans. Albutt⁵ says:

The influence of fear is indeed the only fact in the causation which can be called intelligible. Its direct effect is on the motor centers to induce the movement necessary for escape, which seems to have made the term: movement from, a name for all such mental states and emotions. If that movement is impossible, tremor results, and then we have the word "tremble" as a synonym of fear. He who trembles is said to be paralyzed by fear, and he is in fact for the moment suffering from paralysis agitans. The sudden tremor of alarm has been known to persist, and to assume all the characteristics of the malady under consideration.

Violent fear or fright is a direct cause of hysteria. Of all exciting causes of chorea, fright and sudden shock are the most common. It is also a cause of epilepsy in children, according to Holt,⁶ a cause of spasmodic tics, idiopathic asthma, angioneurotic oedema, diabetes insipidus and spinal progressive muscular atrophy.

Closely allied to fear is anxiety or worry. It is a trite saying that worry kills more people than sickness. The expected does not happen so often as we think, and worry is absolutely useless; but it is hard to convince our patients that this is so, until health is lost in consequence. One of the commonest worries in New England forty years ago was dirt. Housewives talked about it, until it was an obsession; and now they

⁵ Albutt—"Practice of Medicine," Vol. IX, p. 74.

⁶ Holt—"Diseases of Infancy and Childhood," p. 661.

worry about their children. Mental stress of one kind or another is a common exciting cause of epilepsy, and worry and anxiety figure largely. I must not omit to mention that worry with hysteria produces ecchymoses in different parts of the body and has been known to cause embolism and thrombosis. Dermatitis gangrænosa has been known to result from nervous conditions by Dr.* R. A. McDonnell. Pruritus and eczema are direct results as well. The same authority has known two deaths by suicide from syphilophobia, and gonophobia has resulted in the same way. Worry is often an exciting cause of asthma.

Selfishness is the root of much trouble in this world and forms the basis of the hysterical character which Wood and Fitz⁷ say

shows itself rather in the overmastering desire to be the center of sympathy and admiration than in the indulgence of grosser appetites. The hysterical woman is self-conscious and self-centered, always occupied with her own needs and wishes. The will is also weak, the external nature extremely sensitive, and the tendency to impulse provisional, so that the individual is almost devoid of self-control. Emotional instability and lack of control over the emotional nature by the will are two of the most characteristic manifestations of the hysterical state. With or without reason the patient laughs and cries, and perchance on the slightest provocation passes into the most violent paroxysms of laughter and weeping, whose nature is recognized by everyone. The morbid desire for attention and sympathy, joined with the extraordinary importance to the subject of everything that pertains to his or her personality, leads always to great exaggeration of symptoms and not rarely to intentional simulation of disease.

Selfishness leads to worry, and the combination of the two is one of the most prolific causes of neurasthenia. Selfishness alone is often in the rich a cause of neurasthenia. He or she thinks of nothing but himself and his own enjoyment. In his opinion there is no one but himself who should receive any consideration, and while for months, or even years, there is nothing to mar his lazy state of satisfaction with himself and his environment, there comes an hour when even the rich man

⁷ Wood and Fitz—"Practice of Medicine," p. 406.

finds that his money cannot buy him health. Some slight or, perhaps, serious ailment has seized upon him, and the fact that he cannot purchase health and that he in common with all mankind is subject to physical laws, frets and annoys him. He becomes rebellious against the laws of God and man. He is angry and terribly put about, because he who has had his way always, whose plans have never miscarried and to whom the times and seasons have seemed to bow in servitude, has at last been brought to account; and if some acute disease, like apoplexy, does not end his life, he becomes a neurasthenic of the worst type.

There is one kind of mental influence causing disease for which we doctors are responsible; and that is due to our relations with our patients. In a paper read before the Colorado State Medical Society last October, Dr. R. C. Cabot⁸ makes these points:

First—"The Doctor Habit."

Second—"The Physician as a Cause of Disease."

Third—"Psychical Harm from Physical Diagnosis and Treatment."

I will say a few words on each.

First—"The Doctor Habit." It may require a good deal of moral fiber to discourage the patient from coming to our office, when he will be snapped up by our brother across the street; but how often patients are well, and should be told so for their own good and told to stay away.

Second—"The Physician as a Cause of Disease." Our patient has some slight throat or nasal trouble and the time-honored rule is, if there is a local trouble, to "treat it locally," so we treat it, until the chief result is that the patient's mind is continually on himself, when a little general treatment and wholesome neglect would effect a cure. Not every patient with chronic nasal catarrh needs Seiler's tablets and treatment by a specialist twice weekly, for this keeps him in an introspective state, and he may get by this process something worse than chronic catarrh, which is an accompaniment of the longevity for which New Haven is famous. So, too, many

⁸ Richard C. Cabot—"Mind Cure. Its Service to the Community."

women with a slight erosion of the cervix uteri are harmed by local treatment, and if not harmed are very likely to have that kind of hypochondria which has been called "uterus on the brain."

Third—"Psychical Harm from Physical Diagnosis and Treatment." "A little knowledge is a dangerous thing" for our patient. It is all very well and highly important to make a thorough examination in a supposed case of pneumonia, but it is not best to make too impressive (if I may use the word), too frequent examinations of a patient with a slight mitral murmur, or a little irritation of the kidneys, who is in fairly good health. The topographical maps which are drawn so artistically in varied colors on the bodies of our patients may be very instructive to us and wonderful to behold, but what of the effect on our patients? Are not they led to think of their ailments more than is salutary?

If you must listen to his doubtful chest,
Catch the essentials, and ignore the rest.
Spare him; the sufferer wants of you and art
A track to steer by, not a finished chart.⁹

I might tell of the influence of many other emotions and thoughts, but this paper must end. Is it not true, that we often are blind to the fact that we need not hunt and delve to find some new or hidden germ or material cause of disease, but that we have it right before our eyes, if we will only look in the environment in which we live, as shown by the influence of the thoughts and emotions?

DISCUSSION.

DR. FRANK K. HALLOCK (Cromwell): Dr. Gilbert's paper is another example of the widespread interest that is taken these days in the psychological side of medicine. At times, during the past year, it has seemed as if the regular practice of medicine was in danger of partial eclipse. At any rate, nearly every form of treatment was supposed to have a bit of psychotherapy included. As Mr. Dooley might say, the whole field of medicine has a psycho-syrupy flavor about it.

⁹ Holmes—"The Morning Visit."

However, no matter what bad things may be said about the Christian Scientists, the Emmanuel Movement, etc., there is one respect, at least, in which we are indebted to them, *viz.*, they have succeeded in opening the eyes of the profession to a realization of the fact that the psychic is a factor deserving their very profound attention. One can appreciate the change that has come when eminent surgeons, such as John B. Deaver of Philadelphia, will treat the subject of "gastric neuroses" not only from the practical standpoint of the operator, but also with most illuminating knowledge of the psychic and nervous origin of the symptoms.

Dr. Gilbert touches on many points which it would be interesting to take up. For instance, the difference between the nervous and psychic influences in the causation of disease as spoken of by Heiner, *Münchener Med. Wochenschrift*, LVI, No. 10, March 9, 1908, and more recently referred to by Williams in the March number of the *Journal of Abnormal Psychology*.

I will confine my remarks, however, to the pathogenesis of a functional disorder of psychic origin such as indigestion. I am inclined to think that there is no such thing as primary nervous dyspepsia. In the class of cases to which I refer the disturbance of the gastric functions is the result of more or less prolonged or repeated states of mind or mental habits. To illustrate: Here is a man, thirty-eight years old, an attorney of a large corporation. All the morning he is working strenuously. He goes to his lunch with his mind under pressure and intent upon the problems to be solved. He eats his meal with relish and not too fast, although generally in such cases there is undue haste. The mischievous factor, however, is the constant action of his mind all the time he is eating. The intensity of thought and the conscious or unconscious mental stress he is under tends to keep the flow of nervous energy steadily toward his brain. Likewise the blood current continues to flow freely in the same direction. The presence of food in the stomach causes a flow of both energy and blood to that organ, but unless there is a diminution of the amount of nervous force expended headwise, that is, unless there is a relaxation of the intensity of the mental action, the process of digestion may suffer. We may suppose, *e. g.*, that the lessened stimulation of the gastric cells will result in reduced amount of their secretion or that chemically its quality will be deficient. Slowly and insidiously this process goes on until finally positive disorder of function is manifest and then the general nutrition suffers. Consequent upon the impairment of nutrition a neurasthenic state may supervene or actual morbid mental conditions follow.

Thus we see a cycle established: First, presence of faulty mental habit, resulting in, second, disorder of digestive and nutritional

processes, and this in turn affecting, third, the nervous system with the development of states of fear and worry with increase or aggravation of nutritional and metabolic processes.

It is some such way as this, I believe, a very large proportion of the psychoneurotic cases develop. The great practical point is that the true treatment is not from the peripheral end but from the central or head end. That is, there must be a reëducation and training of the mental habits if the best results are to be obtained.

It is, of course, a great satisfaction in dealing with a subject like this to be able to lift it out of the realm of the speculative. While we can only follow the intricate biochemical changes to a limited extent, yet the researches of Pawlow and subsequent investigators encourage us to believe that fuller and more exact knowledge of the relationship between the body cell and the influence of the nervous system will surely come. From the psycho-physiological side it is a comfort to know that the common remark of the mind influencing the body is based upon an accepted law. This law may be briefly stated as follows: Every thought or feeling in consciousness tends to express itself in action. This action is always expressed outwardly, that is, peripherally. It may be manifest externally or internally, as suggested above.

To the great English neurologist, Hughlings-Jackson, belongs the credit of first establishing this law in a scientific sense. Flechsig and his studies confirmed it further. I wish to congratulate Dr. Gilbert upon his presentation of the subject.

DR. FREDERICK T. SIMPSON (Hartford): This subject is undoubtedly an important one, and one which the medical profession has ignored for the last twenty-five years or more because their attention has been entirely concentrated upon the bodily side of disease. At the present time, however, I fancy that we are rather liable to go to the other extreme, and give too much importance to the influence of thoughts and emotions. I do not feel that they play any great part in most of the diseases handled by physicians, such as bacterial infections. I doubt whether they have any relation to any of the great plagues of humanity or to any of the organic diseases, which will occur in persons free from troublesome thoughts and emotions. The sphere of psycho-neurosis is one, I think, in which they do play a large part, and there a great deal of work has been done in demonstrating that thoughts and feelings are causes of psycho-neuroses, hysteria, neurasthenia, and their sister disturbances.

The method of psycho-analysis of Freund has demonstrated that in most of these cases we can go back and discover some very disagreeable and unpleasant experience, especially in the sexual sphere. He

places his hand on the patient's forehead, and makes her go back in her life and repeat all the disagreeable experiences that she has been through, and something that has a bearing upon the psychosis she suffers from is usually discovered in this way. I have had three cases this winter in which this has been demonstrated.

One of these patients was a woman who was suddenly seized with a desire to go out into the street and preach to people. She had just had a miscarriage; and this was followed by depression, which lasted for weeks. I afterwards learned that she had produced the miscarriage herself, and this was preying upon her mind. Another reason, which I did not learn for some time, was that she had been unfaithful to her husband. Remorse for this was the thing that had brought about this condition of melancholy and excitement.

Another patient was a woman who consulted me for simple melancholia. Two months later, she brought her husband to me, and made him tell me that she had once or twice allowed abortions to be performed upon her by physicians.

Several cases of experiences of this kind have come up with patients that I should never have suspected of such an experience or thought of questioning in regard to such a matter. We often find cases of melancholia in women. I have frequently had cases in which they did not desire to have children. On finding themselves in the family way, they have been thrown off their balance and have become a prey to melancholia.

DR. JAMES M. KENISTON (Middletown): This very interesting paper has suggested to me one or two thoughts arising from my own experience. In the catatonic form of dementia praecox there is often a condition of stupor, where one frequently finds very sluggish circulation, and coldness and œdema of the lower extremities. This is less marked in melancholia. We also find functional disturbances of the heart occurring in cases that, on entrance examination, fail to reveal any symptoms of cardiac or arterial disease. In some of these cases the disturbance becomes organic. It strikes me that the reverse side of the picture might be worthy of attention. Dr. Walton has written a book called "Why Worry?" and twenty-five years ago Dr. Tuke wrote a book on "The Influence of the Mind on the Body." While we recognize the influence of the thoughts and emotions in the causation of disease, we should also bear in mind that proper thoughts and emotions when well controlled have a great influence at times in relieving bodily symptoms. I am reminded of a man in a hotel who was disturbed by some one in the room above him groaning. He went upstairs and said to the man, "What is the matter?" The man replied, "A note is due to-day, and I cannot pay it." To this, the gentleman who had been disturbed responded, "Go to bed, and let the other fellow

do the worrying." Josh Billings once said that tight boots would make a man forget all his other troubles. We should all cultivate cheerful emotions and try to impart them to our patients. I find that, notwithstanding worries and cares of my own, it is necessary to present a cheerful appearance before the patients. If we try to do that, we gradually educate our centers so that it becomes habitual. I have now a patient under my care whose case was apparently hopeless. He has been ill and a patient for nearly ten years. He was melancholy, did not speak, and would hang his head. I began by raising his head up and making him look high, also using helpful suggestions. A friend of mine in legal practice lost his first suit against a railroad company, and I saw him coming from his office, walking with his head bowed and his shoulders drooping. I whistled to him, and held my head up. He look over and saw me, and the thought came to him that this was no time to bend his head. He won his next suit against the railroad, and the company engaged him as permanent counsel, saying that it was cheaper to hire him than to pay some one else to oppose him.

DR. EDWIN A. DOWN (Hartford): I am sorry that I did not hear all of Dr. Gilbert's instructive paper, so it is possible that I may repeat some of his statements in the course of my remarks.

One of the chief objects of scientific papers should be to stimulate thought;—and he has aroused mine and caused me to recall many cases coming under my observation which are relevant to his subject. We, occasionally, have to confront a proposition of the laity which affirms that "A healthy mind implies a healthy body"; and hence, without doing violence to any system of logic, many assume that an unhealthy or disordered mind produces an unhealthy body; but if there is one feature in the personal observation of large numbers of the insane which stands out prominently, it is that mental impairment and physical vigor are in many cases coexistent. It used to be an axiom with some town authorities that the cost of burying a pauper was three thousand dollars; which means that the average life of an insane person in institutions is thirty years; and rating the cost at one hundred dollars per annum, the estimate is reached from long experience with these cases.

For a number of years I had personal oversight of a case having a record of fifty-three consecutive years in an institution, and recently saw the record of another case remaining sixty-nine years under like conditions. Cases having a record of thirty or forty years' duration are very common. The fact that these cases of mental defect and inadequacy are placed under the best conditions for prolonging their existence, furnishes an important indication in the direction of accounting for the increasing percentage of the insane in our population.

As a matter of fact, while the processes of nutrition may be temporarily modified by certain mental states chiefly those having an emotional basis, there is no direct parallelism between the two. Were this the fact, the pugilist would be the professional man, and the sage with the encyclopedic brain would be the favorite in athletic events.. Primitive races were known for their physical prowess, but their mentality was of a very low grade.

I often say to patients, "You know too much about medicine, or too little"—a point to which Dr. Simpson has alluded. Many patients have their disorders aggravated by reading symptoms and results depicted on packages containing patent medicines, and in articles in popular periodicals written by the semi-professional or quack writer. I find these to be a source of a large amount of mental disquietude in psychasthenics, and yet while the psychic factor is dominant, the physical features are unchanged. Who among our specialists is not familiar with this stereotyped complaint, "Doctor, my friends tell me I look so well that there can be nothing the matter with me, that it is all imagination. I have really gained — pounds during the past few months, have a fine appetite, and sleep well, but I cannot get rid of this mental depression, and I believe I would do away with myself if I had the moral courage to do so."

In such instances we have the features of an overwrought imaginative faculty with a coincident unimpaired or, in some cases, improved physical condition. Further evidence is furnished by the features in advanced mental cases in which are exhibited increased physical vigor coupled with advancing intellectual decay.

Dr. Gilbert has given us an immense amount of material for thought, in a field that seems boundless. Let me speak a word or two regarding the result of mental impressions or images on physiological processes. I am reminded of a story in the book of Genesis. We read there the account of how Jacob made an arrangement with Laban, his father-in-law, that all the sheep which were ring-streaked and spotted should belong to himself; while the others should belong to his father-in-law. What I want to show is this, that Jacob must have had some knowledge of the effect of mental impressions on progeny, for his method and the results justify this assumption. He cut a number of saplings, and "pilled" or stripped them so as to show streaks of white. When it came time for the ewes to conceive, he picked out the strong ones and placed them where they could see these streaked saplings; all others he placed where they could not see the white streaks. The result was that all the stronger ewes bore ring-streaked and spotted lambs, and the weaker ones did not. The stronger lambs therefore belonged to Jacob, and the weaker ones to Laban. Jacob became very

wealthy by the practice of his method, while his father-in-law became impoverished.

This incident is introduced for the purpose of showing that even in remote periods the close relationship of mind and body was clearly understood from its practical side, while the practitioner lacked the advantages of a medical training. Is it a matter for surprise, in view of the foregoing, that our Hebrew friends of the present day should be looked upon as sagacious and successful business men?

It is gratifying to have such a paper as Dr. Gilbert has presented to us for consideration and discussion, and my hope is that we may have others like it in the near future.

The Physician as an Educator in Sanitation.

FRANK E. GUILD, M.D., WINDHAM, CONN.

In any consideration or study of the subject of public hygiene, one is immediately impressed by the fact that it is so largely a matter of the pathogenic bacteria, their destruction, or the prevention of their dissemination.

It is true that there was some appreciation of the value of cleanliness, and some effort to enforce it by law, previous to the comparatively recent discoveries of the nature and activities of the bacteria. But it was a mere groping in the dark and entirely lacking in scientific basis. Beyond this, it is interesting to reflect that but for the improvements in the microscope, these discoveries would not have been possible.

About 1590 Hans and Zacharius Zansz of Middleburg invented the compound microscope; but this instrument was of little value for medical purposes until in 1837 Dolland's discovery of the principle of the achromatic lens was perfected and adapted to the microscope. With this aid, it became of great value, both as a help in diagnosis and as a means of identifying micro-organisms which are known to-day to be the cause of many of the diseases whose origin before this time was unknown, or at best only guessed at. Indeed, it is profitable to note the many varying theories of the causation of disease previous to 1876, when Robert Koch proved that bacteria were the cause and not the product of disease.

Our earliest knowledge of the theory of disease is "The Demonic," which recognized the occupancy of the affected body by an evil spirit or demon.

This gave place to the "Humoral or Hypocratic Theory," which maintained that the body contained four humors—blood, phlegm, yellow bile, and black bile. The right proportion of these humors, properly mixed, constituted health, while an inharmonious mixture caused disease. Of the intervening

time, between Hypocrates and the seventeenth century, Osler says: "Practically there was no such thing as an accurate study of clinical medicine. In what is known as the scholastic period, the three centuries before the Renaissance, authority and dogma ruled supreme and Philosophy and Medicine alike were a confused jumble of Greek and Arabian authorities."

With the seventeenth century came Thomas Sydenham, who claimed that disease is nothing more than an effort of nature to restore the health of the patient by the elimination of morbid matter.

The eighteenth century established the views as held to-day upon constitutional or intrinsic, but added nothing to our knowledge of infectious or extrinsic diseases. The nineteenth century was pregnant with discoveries. As early as 1837 Bassi showed the parasitic nature of a contagious disease of the silkworm. Two years later, Schoenlein proved that favus of the human scalp was due to a parasitic fungus.

Between 1857 and 1863 Louis Pasteur finally established the germ theory. With this new knowledge, the responsibility of the physician was greatly increased. Although previous to this time the communicability of disease from one individual to another was recognized, the direct causation was not known and prevention was not considered, with perhaps a few exceptions.

When we take into consideration the fact that fifty per cent. of all maladies are extrinsic and preventable, we can better realize the physician's relation to the public.

The epithelium of the skin and mucous membrane is a shield against the invasion of bacteria into the living body. In order that a germ may find entrance into the body it must penetrate this defense. There are four avenues by which bacteria gain admittance into the living organism: first, by inoculation; second, through the alimentary tract; third, through the respiratory system; fourth, through the genito-urinary apparatus. The entrance by inoculation is accomplished in two ways: first, by wound infection; second, by the bites or stings of infected insects.

To the physician and sanitarian belong the care and prevention of such infection and their endeavor should be to guard these portals.

Many of us remember when infectious diseases were divided into three classes—contagious, miasmatic and miasmato-contagious. This was before Grassi proclaimed *Anopheles Claviger* as the true transmitter of malaria, or the proof was had that the typhoid germ needed no period of incubation in the earth before being transmitted from the individual to the individual. This was before that quartette of heroes, Reed, Carroll, Lazear, and Agramonte, offered their lives in order to prove the mosquito to be the true carrier of yellow fever. With this new knowledge of the transmissibility came greater efforts for prevention.

There is no need of recounting the success which has followed the intelligent application of the knowledge thus gained in stamping out malaria, yellow fever and bubonic plague. Our interests center more in the prevention of those diseases which are continually with us. We recognize the alertness of the medical profession in its fight with tuberculosis, and we believe the time is not far distant when this dread disease shall be controlled as successfully as is smallpox and diphtheria. But with our endeavor to stay the ravages of the "Great White Plague" we must not overlook the prevalence of other diseases, carrying a menace as great and seemingly easier of control. During the eight months beginning with August, 1908, and ending with April, 1909, according to the monthly bulletin of the Connecticut State Board of Health, there were in Connecticut 2,329 deaths from infectious diseases alone, not counting those from tuberculosis, which numbered 928. This must have been but a small fraction of the number of those sick with these diseases, as the majority of those afflicted recovered.

How many of these deaths and how much of the discomfort and cost of the sickness of those who recovered might have been prevented if proper sanitary precautions had been observed, it is impossible to say. We know that proper precautions were not taken and we believe there can be much

more done in the way of prevention than is being done, and we are quite sure that this condition prevails from carelessness and ignorance.

If it were possible for the State of Connecticut to use as much money for the proper instruction of its citizens and the supervision of its sanitary conditions as is now paid for costly public libraries and armories, whose principal use is the adornment of our cities rather than the dissemination of knowledge or the addition of comforts to its people, this state of affairs would not exist. If we could convince our legislators of the necessity of men properly trained for the position of health officers in our country towns, whose salaries should be commensurate with the responsibilities required, we might show greater results in the way of sanitation.

We all recognize the necessity of pure milk. We also understand the difficulties attending the procurement of the same. We cannot require the producer to furnish us with this necessity of life at a loss to himself. There are many families that are obliged to live. Their incomes are small and their mouths are many. They are the ones who should have the purest milk at the lowest price. How can it be done? That is one of the problems to be solved. How to dispose of the sewage of our cities without contaminating our rivers at the risk of spreading pestilence and death along their borders is another problem for solution.

How to arrange the pigpen, the sink drain and the privy so that they shall all be convenient for our rural brothers, without mixing their overflow with the waters of the nearby well, calls for still more ingenuity.

How to quarantine a whole family in the same room with a scarlet fever or a diphtheria patient and have an easy conscience and an assurance that no harm shall come to those exposed, and how to disinfect that room, after the disease has run its course, without menace to future occupants, are other perplexing questions.

These problems are capable of solution only when the health officer of each town is a man acquainted with the laws of

health, who shall understand how to dispose of sewage in such a way as to be harmless, who shall know whether there is likelihood of the contamination of wells or springs whose waters are used for household purposes, who shall know how to disinfect a room where there has been contagion, in a thorough, painstaking, and conscientious manner, who shall attend to these matters himself and not leave it to some member of the family who knows nothing of how disinfection should be done. How is this to be brought about? Only in one way and that way is education.

We must use the same weapons against all infectious diseases as are now being used in our efforts to exterminate tuberculosis. The masses must be educated to know something about sanitation and to demand supervision of an intelligent kind.

Who is to be the educator? That profession whose record has always been a self-denying and self-sacrificing one; whose members have ever been ready to give the best there is in them to alleviate human suffering and add to human happiness; who have ever given not only their time and their energies, but their lives, that others might live.

DISCUSSION.

DR. JOSEPH H. TOWNSEND (New Haven): I am sorry not to have heard a paper by Dr. Guild on the subject announced on the programme, "Disposal of Sewage in Rural Districts," as I consider it a very live and important question. The introduction of public water supplies in many of our villages with the installation of water closets and bath rooms has resulted in a great volume of sewage being discharged into old cesspools and drains that are totally inadequate to take care of it. This makes the demand for some system of sewerage imperative.

Referring to the paper read, Dr. Guild has very properly answered the question, as to who is to be the educator of the public in sanitation. The discovery of the germ origin of many diseases has opened up the field of preventive medicine, so that the physician of to-day is not only a healer of disease, but also a preventer of disease. It is his work to teach people that it is not the heat of summer that produces diarrheal diseases but the effect of the heat in developing bacteria in milk and other foods; to show that the public water supply is better

than the old well, even though it be grandfather's well, because the neighboring soil is no doubt honeycombed with cesspools and other filth; to teach that dwellings and their surroundings must be kept so clean that bacteria and bacteria-carrying insects can find no breeding places near them and that the body must be kept in such a good state of health that germs can find no lodgment in it. In the great fight of the present day against tuberculosis, while the sanatoria have their proper place, it is the good old family doctor that must bear the brunt of the battle. He must tell the people how to care for the consumptive in his home, so as not to be a menace to the community and at the same time not make his condition more unfortunate by causing him to be shunned by others.

I agree with Dr. Guild that the state ought to so equip its health department that it may offer all possible aid to local health officers, and also that the latter should receive a proper compensation for their services. I know of several thriving villages where painstaking men in such positions get less than one hundred dollars a year. In some of our cities, the health officer needs to be secured of a sufficient tenure of office to make it worth his while to perfect himself in his specialty. The incumbent of this office should not be changed every time there is an election. His compensation should be what is considered just to other public officials requiring special training, such as court officers. Even the lowest court officer receives a higher salary than the health officer in most places.

You will wonder what is to become of the physician when this Utopian age is reached and we get the minimum amount of tuberculosis, typhoid fever and other germ diseases. Well, by that time people may have adopted the custom, said to be prevalent among the Chinese: they will pay the physician to keep them in health rather than to cure them when ill.

DR. EDWARD K. ROOT (Hartford): The change in the title of the paper or, rather, in the paper itself, will, I hope, develop some of the points taken up by Dr. Townsend regarding the management of the more simple sanitary problems in rural districts, such as care of sewage, garbage, etc. Dr. Guild has mentioned the problems that confront us and has correctly placed his finger on the principal point, that all progress, from the sanitary point of view, must be one of education, and that the medical practitioner must be the educator. Very few persons realize how true that is, and how important, especially when dealing with infections. Probably you do not know that there is now no law in Connecticut that sanctions the forcible removal of a smallpox patient from his home to a pest house. Public opinion, however, has long since established the custom, and decreed that he

must be taken from his home to a hospital for contagious diseases, even at the risk of his life. Public opinion is gradually coming around to the view that other infections should also be transported to a special hospital. At the present day, very few persons realize the importance of a public notification of contagious diseases. They like to have their neighbors do it; but that they should themselves do it, is not so firmly fixed in their minds as always to be acted upon. When we come to the question of tuberculosis, we see that it is only just beginning to be recognized that this disease should be thus treated. How many of you, when you know that a patient has tuberculosis, have instantly and promptly notified the patient of his condition, and notified his friends and guardians? You will acknowledge that you have usually said that the lungs were not affected, but only the bronchial tubes; that the patient had only a throat affection, and not tuberculosis. How many of us have been guilty of this? For years, the reports of such cases have been less in number than the deaths from this disease; and the mortality is not 100 per cent., as yet. If we are going to accomplish anything, we must be honest and tell the patients that they have the disease. Though this is likely to frighten them, it will frighten them less to know that they have a disease in which the percentage of cures is large than to be buoyed up with false hopes and nursed along until they have reached the third stage. People are gradually coming to realize that tuberculosis is like other diseases, running its course, with the majority of patients getting well and only a moderate percentage of those infected dying, and that, taken in time, it offers a reasonable chance for improvement and ultimate complete recovery. This means an effort on our part to deal frankly with our patients; because, if they find that we are concealing it, how much more are they going to conceal it from the health officers? If we are going to educate the public, we must be honest with them.

It is gratifying to learn that in communities in which public interest in tuberculosis has been so much stimulated of late more incipient cases are being brought to our hospitals. Physicians are beginning to instruct the public that the time to treat such cases is early. At some future meeting we can deal with some of the other problems in sanitation.

DR. GEORGE BLUMER (New Haven): I just want to call attention to two points connected with the subject of public health. The first of these is that if you look at catalogues of medical schools, you will find that they usually show that the subject of public health is gone over in rather a perfunctory and heterogeneous course of ten or twelve lectures. As a matter of fact, in our medical schools we do have

very little education in preventive medicine. We do not do nearly so much in this respect as the Germans and other Europeans. If you will think over the matter, you will see that there are in this country not more than three or four universities that have a department of hygiene and a hygienic laboratory. There is one at the University of Pennsylvania, one at Harvard, and one at the University of Michigan; but otherwise, no hygienic department that does any real work. The subject is shamefully neglected in American medical education.

The second point is that we are always behind European countries in the matter of health officers. They do not pick out a man because he is a Democrat, a Republican, or a Mugwump. He has to take a special degree, before he can occupy the position. In this country, there is only one university that offers a diploma in public health comparable with those obtainable in England and Canada. Before we begin to educate the public, we must educate the medical profession.

DR. CHARLES J. BARTLETT (New Haven): In the discussion of the spread of tuberculosis, typhoid fever, etc., we often forget to mention flies as one of the means of carrying infection. My reason for mentioning this is the recent appearance of an interesting pamphlet on the subject. This is published by a committee of the Merchants' Association of New York. Mr. J. Pierpont Morgan and Dr. Albert Vander Veer are members of the committee. The pamphlet is entitled "The House Fly at the Bar," and as a frontispiece, a monstrous fly is held by a police officer before Uncle Sam as the presiding judge. As exhibits are presented the filthy footprints of the fly on various articles of food. It also gives a reproduction of a sheet of information regarding the fly, published by the State Board of Health of Florida. On one side of the border of this sheet are shown the stables, outhouse, garbage pail, spittoon, etc., with the flies about them. Then the flight of the flies to the opposite border is indicated where the cream and other articles of food are shown with the flies feeding on them, and below these in true sequence comes the bed with its typhoid patient. The pamphlet shows in a striking manner the dangers of the common house fly.

Appendicitis during Pregnancy.

OTTO G. RAMSAY, M.D., NEW HAVEN, CONN.

My idea in giving you a paper on the subject of appendicitis and the pregnant state is partly to call to your notice the change in the attitude of most surgeons in their general position as regards the subject. I operated some years ago on a pregnant woman with appendicitis, finding a general peritonitis and having her die about twenty-four hours later. This case interested me and at that time I made a careful search through the literature, collected about ninety published cases and read a paper on it.

The first point that struck me at that time was the fact that before 1894, when Munde wrote his first paper, only five or six cases altogether had been reported. This is curious, for though our knowledge of appendicitis is comparatively recent, still so much interest was taken in the subject as a whole, that had the condition been as common as we later supposed, it would have been more widely noted before 1894, the date of Munde's paper.

Following up Munde's paper, which was practically epoch making, as it first called direct attention to the condition and discussed the possibilities, Abraham in 1897 and Marx in 1898 wrote papers which are still referred to as authoritative. Following this lead, in the next few years many authors added their quota, though when I looked up the subject in 1902, I could collect but ninety cases and they were all serious ones.

I mean by this, that most of the cases reported up to that time either ended fatally or were of very severe grade, and it was evident that only the bad cases were considered of enough importance to report in the journals, while the simpler cases which got well without operation were not noted. This

naturally meant that an extremely pessimistic view as to the fatality was taken by most authorities.

Naturally I was struck, in working over the subject, by the same point of view and my conclusions based on the ninety cases were wrong, in that entirely too much stress was laid on the supposed exciting effects of pregnancy in causing a primary attack of appendicitis, or in lighting up an old case, and also in considering the pregnancy to materially increase the virulence and danger of the attack. That in certain cases it undoubtedly is inclined to markedly increase the fatality, I am still assured, but on the other hand, I am sure that we laid too much stress on the softening of the pelvic tissues, the increased lymphatic circulation and the other accompanying pregnant conditions.

Since writing the first paper, I have followed the slow change of opinion, as more and more series of cases have been reported, and I think now that we are in a position to draw more accurate conclusions. Renvall of Engstrom's clinic in Helsingfors appeared in 1908 with an extremely elaborate article on the subject, reporting about 250 cases collected from the literature and from Engstrom's clinic, and to these I have been able to add about fifty more, some of them having been missed by him in his review of the literature, some of them having appeared since, with six personal cases of my own which have not been reported.

These 300 cases include many of a less severe type and, though still darkly tinged from the very fatal ones which were reported early, give us a fairly representative presentation of the relationship between pregnancy and appendicitis, though it is true that even yet we may have too few cases to properly understand the subject.

First, in regard to the frequency, Marx, among the earlier writers, says that while it is rare during pregnancy, it is more common in the pregnant than in the non-pregnant female and calls attention to the enormous congestion of the whole genital tract and the marked constipation as predisposing conditions. Following Marx's lead, the same fact of the greater frequency during pregnancy was insisted on by other authorities.

This, however, I am sure is not true; for instance, Renvall, speaking of Engstrom's clinic, found a percentage of one case in every 111 pregnant women, and of course, as it was a hospital, they would see more of the pathological than the normal cases. In the New Haven Hospital, where we have, roughly speaking, about 100 confinements a year, we have had but one case of appendicitis during the pregnant condition in nine years. This may be rather unusual, but I think we can safely say that appendicitis is not more apt to attack primarily the pregnant more than the non-pregnant women.

In regard to the possibility of pregnancy lighting up an old appendicitis, the answer is not quite so clear and there is still a marked difference of opinion. Many authorities, especially those writing in the earlier years, laid great stress on the influence of pregnancy in lighting up an old appendicitis; some of them blame for this the constipation of the pregnant state, others speak of the increased congestion of the pelvic and abdominal organs as a causative factor, though Schauta points out that from our present knowledge, this passive congestion should lessen rather than increase the liability to inflammation. Other authorities call attention to the possibility of a stretching or displacement of the adherent appendix by the enlargement of the uterus and the displacement upward of it and of the appendages on the right side, and as we know that the appendix is often adherent to the pelvic structures, it seems that this stretching may exert some influence, both by the direct pull from the displacement of the uterus and by the twisting which might easily interfere with the normal blood supply.

In one of my cases the woman, who was between five and six months pregnant, gave a history of having had previous appendix attacks and at the operation we found the inflamed appendix displaced upward higher than usual into the general abdominal cavity and densely adherent to both the tube and ovary on the right side. Quite a number of the reported cases, too, give a history of previous attacks, with a worse one during pregnancy, and there are several cases reported where the symptoms of appendicitis only appeared during pregnancy.

Thus Tuffier reports a woman who in three succeeding pregnancies had appendix symptoms, an operation being done during the third pregnancy.

In his case, however, there was in the first place a small right-sided ovarian cyst, and though the appendix had a fecal concretion, there were no adhesions between it and the appendages or uterus, so that this cannot probably be counted as showing the etiological factor of adhesions between the appendix and appendages. Without this, however, there are enough cases reported to make one feel that there is sometimes a direct relationship between the lighting up of an old inflamed or diseased appendix and pregnancy.

This is, however, not always so by any means, as I have watched several women through one or more pregnancies, who have had before their pregnancies one or more definite attacks of appendicitis and who during their pregnancy showed no signs of recurrence of the trouble; and for one of them I removed the appendix later for a severe attack, coming on about eighteen months after she was delivered. I think, then, in this connection, we can safely say that there is possibly a slightly increased liability for a recurrent attack of appendicitis during pregnancy, but that this is not universally true by any means.

The next question that comes up is, Does pregnancy increase the severity of the attack, or does it make it more fatal? It seems in this connection that the cases must be divided into two classes: that is, the so-called catarrhal or non-suppurative and the suppurative cases. In the first group, the pregnancy exerts as a rule but little influence; that is, the resolution appears about the usual time and the pregnancy is not disturbed by the attack.

In the suppurative cases, it is somewhat another story and pregnancy appears to exert a direct deleterious influence. Whether this, as is supposed by some, is due to the increased softening or loosening of the pelvic and abdominal tissues, with a widening of the lymphatics and an increased readiness of extension; or whether it is due, as supposed by Futh, to the drawing up of the cæcum with the growing uterus, so placing

the infected area higher up in the abdominal cavity; or finally, whether, from some condition inherent in the pregnant woman, the local lymphatics or the local tissues are less resistant to the appendix inflammation, is not sure. At any rate there are many suppurative cases which run a very rapid course and, unless operated on very early, are almost certainly fatal. Also in cases where a localized abscess is formed, there is danger of this being opened by the dragging upward of the expanding uterus, or its sudden change of size during miscarriage or delivery.

The effect of the appendicitis on the pregnancy is also of interest. The earlier writers speak of the frequent occurrence of abortion or premature labor. Thus in sixty-seven cases which I collected, and these were chiefly the earlier cases, in which notes of the pregnant condition were made, I found abortion before or after operation in thirty, abortion without operation in nine, or thirty-nine abortions out of sixty-seven.

Here again, however, we must differentiate between the two main groups, the non-suppurative form rarely causing an abortion. In the suppurative form, in which must be grouped practically all of the mentioned sixty-seven cases, it is another matter; and though in the more recent literature I find many cases of suppurative appendicitis in which pregnancy has gone to term, there is always the danger of abortion.

This may be due to a direct infection through the uterine wall by continuity of tissues; or through the free lymphatic circulation it may be due to the circulation of toxins in the blood; or to the high temperatures, which may either kill the foetus or act directly on the uterus through its nervous connection; or the general peritonitis may irritate the uterus. The explanation, I think, of the less frequent abortions now, is the fact that we know more of appendicitis, have better indications for early operation and relieve the patient of the offending organ before there is the chance of toxin formation, bacterial extension or direct irritation.

The symptoms of appendicitis in pregnancy are usually those which accompany the disease in general and I need not consume your time in relating them.

In the diagnosis, there is usually not much difficulty, though the increasing size of the uterus is sometimes disturbing and it has been advised to roll the patient on the left side in cases where the uterus is large, thus exposing to easier palpation the appendix area. There are several conditions that I might mention as causing confusion in the diagnosis. Many women, sometime during the course of their pregnancy, experience more or less pain from stretching of the round ligaments, and if the pain is only on the right side it is easy to mistake it for appendix pain. On examination, however, its situation is different and generally a day or two in bed will cause its absolute disappearance.

Some of the other acute abdominal conditions may be confused with it also. One of the patients of whom I have already spoken was operated on for a supposed intestinal obstruction. This patient, the day before the operation, began to suffer with some general abdominal cramps, then developed abdominal distension with nausea and vomiting; the pulse became rapid and her condition rapidly grew worse; all attempts to move the bowels failed and within thirty hours after the beginning of the attack she was operated upon. Some hours before the operation the following note was made: The patient was lying on side with knees flexed, the face was drawn, the eyes sunken and the nose pinched. The temperature was normal, or only a few tenths above; the pulse was 118 and of poor quality. She was able to lie easily on the back and extended her legs with but little pain. The abdomen was markedly distended, no intestinal motion observed; on palpation the walls were tense and there was general tenderness, most marked around the umbilicus; the uterus was easily felt just below the umbilicus. As I say, this case was operated upon, supposing she had an intestinal obstruction, but on opening the abdominal cavity a general peritonitis was found. The appendix presented at the abdominal wound was markedly swollen and showed a necrotic perforation near the base. The intestines showed in various places blackish necrotic areas, varying in size from a pea to spots the size of a quarter. The

abdomen contained a large quantity of thin, muddy, serous fluid and there was no attempt anywhere to form adhesions. Of course in like manner other serious complications might be mistaken for appendicitis, or vice versa.

The treatment, from what we know in general of appendicitis, should not be extremely difficult to outline, though the fact of the pregnant condition must always be considered, as increasing apparently the danger in suppurative cases.

First, in the simple non-suppurative cases, if the leucocyte count is not high and the general condition of the patient is good, with the pulse and the temperature not greatly elevated, the operation can pretty safely be deferred. This deference may be an indefinite one; that is to say, until at least the pregnancy is over, or it may be only until the acute condition has subsided, when the appendix is removed in the interval. This question of whether an interval operation shall be done or not during the continuance of the pregnancy depends partly on the individual preference of the surgeon and partly on the individual case. Thus, for instance, the further advanced the woman is in her pregnancy, the more difficult the operation is, and for this reason an interval operation in the later months is usually contra-indicated, unless there has been a history of several severe attacks, or unless there is persistent discomfort or pain remaining in the appendix region after all the other symptoms have disappeared.

On the other hand, in the earlier months of pregnancy the operation is but little if any more difficult than the usual appendix operation. There seems but little reason to fear an abortion as the result of it and in this class of cases the usual interval operation is often done.

In the cases of greater severity, there seems but little question in the minds of most operators that the sooner the operation is done the better chance the patient has. Thus in any case where there is much rise of temperature, or where there are pulse changes, or where there is any abdominal distension or muscle spasm, a blood count should be made immediately; and even if there is a moderate leucocytosis, especially if the

polymorphonuclear leucocytes are increased, an immediate operation is indicated. In fact the rule "When in doubt operate" is certainly a just one in these cases, and the results of early operation are very striking when contrasted with the very large death rate of earlier years, when operation was postponed until the patient was almost moribund.

With these suppurative cases, especially when they are operated on in the later months of pregnancy, the pregnant condition often is a serious complication. Thus the tube and ovary may be densely adherent to the suppurative or gangrenous appendix, materially increasing the severity of the operation and giving it a much wider field with naturally increased chances of infecting the general peritoneum. The tube and ovary or the uterus may also form part of the wall of an abscess cavity, making it more difficult possibly to drain, or what is more dangerous, the uterus may suddenly change its size, as the result of an abortion or premature labor, thus opening the abscess cavity to the general peritoneum. This danger is undoubtedly a real one and several obstetricians have recommended emptying the uterus before operating on the appendix abscess, though the advice has not been generally accepted and usually, if drainage is carefully placed, there will be no general infection of the cavity, even if the uterus does empty itself.

I should like to end by giving you a few general conclusions:

(1) That appendicitis is not more common in the pregnant state, and for this reason that pregnancy cannot be considered as an exciting cause of a first attack of appendicitis.

(2) That pregnancy probably slightly increases the tendency to a lighting up of the old condition, in case the woman has already had one or more previous attacks, though this is not invariable by any means.

(3) That in suppurative appendicitis the severity of the attack is often increased by the pregnant condition.

• (4) That in the simple catarrhal cases, with a low leucocytosis, an operation is better deferred, either until the end of the pregnancy or until a sufficient interval has elapsed to give complete subsidence of the symptoms.

(5) That in the severer grades of appendicitis an early operation is always indicated.

(6) That in suppurative appendicitis the pregnant condition undoubtedly increases the gravity of the prognosis.

DISCUSSION.

DR. EVERETT J. MCKNIGHT (Hartford): I think I can almost entirely endorse the conclusions drawn by the writer of the paper. The first of these was that appendicitis is not more common in pregnancy than in other conditions. I think, however, that it differs greatly from the same condition in normal individuals. I believe pregnancy to be the exciting cause of gall-bladder diseases, but I consider that it is not so in appendicitis, unless there has been a previous attack. Second, that pregnancy increases the tendency to light up an old appendicitis is true. Third, that in suppurative cases, the severity of the attack is increased is also true. Fourth, that in simple cases with a low leucocytosis, operation had better be deferred, is, I think, against Dr. Ramsay's second conclusion, that pregnancy increases the tendency to light up an old appendicitis. The statistics of operations for appendicitis in the early months of pregnancy show that it is very uncommon to have an abortion to follow an early operation. I think that we should operate, unless a contraindication exists, upon every case of appendicitis in the early months of pregnancy.

Dr. Ramsay spoke of the effect of the stretching of adhesions, by which the appendix is pulled up. This might interfere with the blood supply and cause a serious attack. We should operate in the early months, if the woman shows symptoms of appendicitis.

I have had an interesting case of papilocystoma of the right ovary. It was much larger than any pregnancy could be. It extended posteriorly, carrying the appendix outside of the tumor; and the appendix lay spread out between the tumor and the abdominal wall, where pressure was constantly exerted upon it. If the appendix had been adherent, the patient would have had trouble. The appendix was perfectly normal, however.

It seems to me that even in the later months, with an attack of any severity and a moderately high leucocyte count, we should always operate.

DR. OLIVER C. SMITH (Hartford): This is a most interesting subject. Suppurative appendicitis in the later stages of pregnancy carries a mortality of 75 per cent. We are all, I am sure, grateful to Dr. Ramsay for presenting this paper. The condition is one in which there has been no definite rule as to practice. The general practitioner often feels that

operation for appendicitis in pregnancy is prohibited, but attacks of appendicitis should always be operated upon unless there is a distinct contraindication.

We divide these cases into two classes, early and late. I approve of operation in mild catarrhal appendicitis in early, but not in late pregnancy. In the latter there is more danger of bringing on labor. In late pregnancy with mild appendicitis we should temporize, in a severe attack we should operate.

We have had ten appendectomies complicated by pregnancy, in seven of these cases the pregnancy was in utero, in three it was ectopic. In the uterine pregnancies the length of gestation ranged from two to six months, in the ectopic one to three months. Time elapsed between date of onset and operation from two to seven days. The diagnosis was comparatively plain in the seven cases of acute or chronic appendicitis complicated by pregnancy. In the three cases complicated by ectopic the diagnosis was not so clear; in the second case the ectopic gestation was not suspected. In these ten operations there was one fatality, occurring one month after the operation. The patient was desperately ill when operated upon with gangrenous appendicitis and free pus complicated by three months pregnancy. She did remarkably well following the operation, but a residual abscess collected posterior to the uterus which was not detected until too late. Death was caused by general peritonitis due to the rupture of this abscess. (See table following page.)

My conclusions are: that the operation of appendectomy in the early stages of pregnancy is a comparatively safe and proper procedure; that in late pregnancy it should only be done in an emergency; if it is not necessary to manipulate or operate upon the adnexa, pregnancy, in the majority of cases, is not disturbed; with a small, intramuscular incision port-operative hernia will rarely occur.

DR. OTTO G. RAMSAY (New Haven): I believe, too, that in the simple catarrhal cases in the early months of pregnancy, it is many times wise to operate. I merely defer the operation until the acute symptoms disappear, for if there are any adhesions, the operation will be less bloody. I spoke of the interval operation, rather than operation during the existence of acute symptoms. I believe that if there is the slightest question about it in pregnancy, the appendix should be taken out then and there.

APPENDICITIS COMPLICATED BY PREGNANCY.

Name	Op. Rec.	Age	History	Symptoms	Operation	Result
M B	1-P. 10	..	2 months preg. 1 previous attack appendicitis.	Usual sympt. acute appendicitis.	2 days after attack. Large cystic ovary.	Recovery, miscarried in 5 days.
M S B	1-P 18	29	3 months preg. Primary attack appendicitis.	Pain, vomiting, distension, rigidity, T. 101. P. 120.	Gang. Appen. Free pus.	Reacted well; died 1 month later, residual abs.
G J	1-118B	29	3 months preg. Previous attacks appendicitis.	Pain, rigidity, T. 102½.	Gang. Appen. Free pus.	Recovery, preg. undisturbed.
A N	3-867	36	6 months preg. Primary attack appendicitis.	Abdominal pain	Long inflamed appendix.	Recovery, preg. undisturbed.
J F	4-1727	33	3 months preg. Previous attacks appendicitis.	Abdominal pain and tenderness.	Chronically inflamed appendix.	Recovery, preg. undisturbed.
P	....	23	2½ months preg. Previous attacks appendicitis. Irregular menses.	Distinct sympt. appendicitis.	Chronic appendix.	Recovery, miscarried in 10 days.
J W	1-270	28	Op. for ectopic 1 year previously 2 months preg. Prev. attacks ap.	Distinct sympt. appendicitis.	Acute, suppurative appen.	Recovery, preg. undisturbed.

APPENDICITIS COMPLICATED BY ECTOPIC GESTATION.

J K	1-127	26	3 months preg.	All sympt. appen. Also had fibroid.	Acutely inflamed ap., pediculated fibroid, tubal gestation removed.	Recovery.
E O W	2-555	26	Preg. not suspected. For 2 years attacks abdom. pain diagnosed appen.	Pain, vomiting, distension, tenderness.	Chronic appen., ruptured ectopic; preg. at 1 month.	Recovery.
M C	3-1069	22	Right abd. pain for 2 months.	Severe pain and tenderness.	Inflamed appen. Ruptured ovary.	Recovery.

SURGICAL PAPERS

Ectopic Gestation.

P H. INGALLS, M.D., HARTFORD, CONN.

In order to bring this matter properly before us for discussion it does not seem necessary to go at much length into the causes of ectopic gestation. The facts we have at our command are not absolutely positive. Many theories have been advanced as to the causes which lead up to this condition. I think it is well settled in the minds of the majority of observers that the fertilization of every ovum takes place somewhere in the tube. In other words, all pregnancies originally are tubal pregnancies. Then allowing that the ovum has been fertilized naturally, and allowing that the structures are in their normal anatomical physical condition, the fertilized ovum descends into the uterus and normal pregnancy ensues.

In cases of ectopic gestation, anything of an abnormal nature with the ovum or with the structures or function of the tube may cause tubal pregnancy to take place. What the condition is has never been satisfactorily explained, even though a great deal of investigation has been carried on to settle the problem to the satisfaction of the minds of the pathologists. Many argue that there must be some change in the character of the epithelial lining of the tube, or some mechanical obstruction, or some diseased condition affecting the lining and structure of the tube itself. Any of these instances occurring would naturally interfere with the downward progress of the fertilized ovum to the uterine cavity. Webster, however, feels that there has been some peculiar structure developed with decidual reaction, which has rendered some portions of the tube particularly adaptable for the lodgment and growth of the fertilized ovum at some particular point. These, of course, are all theoretical in character and do not interest us in the treatment of the cases of ectopic gestation, and we must simply

admit the fact that we know in a percentage of cases tubal pregnancy persists and develops sometimes to a point of marked danger.

The next interesting stage of the condition is what happens in the progress of the gestation. For convenience of description the condition has been divided into three classes—ampullar, interstitial and infundibular. In a few cases there has been almost positive proof that an ovum has migrated through the tube and has become lodged and developed outside of the cavity of the tube in the abdomen, forming its attachment either to the fimbriated extremity of the tube or to some portion of the broad ligament, thus allowing the fœtus to develop enclosed within membranes and become a true abdominal pregnancy. There are also a few cases, very small in number, in which the ovum has become engrafted into the ovary and pregnancy has ensued, going on even to the point of rupture, and the structure has been found to be a true ovarian pregnancy.

Allowing that the pregnancy has taken place in the tube, there are of course certain changes in the tube wall, which seems to be rather deficient in muscular structure and will not allow of as much distention and growth to accommodate the enlarging ovum as will the structure of the uterus, which nature has prepared for the carrying out of this process of nature.

All of these cases of pregnancy must terminate either in an abortion through the fimbriated extremity of the tube, or by a rupture of tube wall, or by a migration from the tube and the growth of the pregnancy elsewhere, as previously spoken of. It has been estimated by men who observe a large number of cases that 78 per cent. of all cases terminated in a tubal abortion and 22 per cent. terminated in tubal rupture.

In tubal abortion there is generally an expression of the ovum through the fimbriated extremity of the tube, accompanied by a greater or less loss of blood and death of the fœtus, absorption later of the expelled contents, and the spontaneous clearing up of the symptoms. Sometimes the placenta may

not come totally out of the tube and may become attached to the fimbriated extremity, and from this an abdominal pregnancy may ensue.

One very interesting and remarkable case, showing one of these obscure and rare terminations of a tubal pregnancy, occurred in my service at the Hartford Hospital some years ago. The patient had supposed herself pregnant; had had more or less pain; had had no symptoms of hemorrhage which she could recall, and presented herself at the hospital on account of a severe aching and pressure in the pelvic region. Upon examination we were able to accurately map out the uterus bimanually, showing it only to be slightly enlarged. Posterior to the uterus, crowded well down in Douglas's cul-de-sac, we were able to make out the sutures of the foetal head. The case was examined carefully by several members of the staff and we made up our minds that we had a case of extra-uterine pregnancy to deal with, and it was decided to operate. Upon operating, when we opened the abdominal cavity, instead of finding the foetus enclosed within membranes, as all cases of abdominal pregnancy are supposed to be, we were very much surprised to find this foetus floating freely in the cavity of the abdomen, confined by no sac or membrane of any sort. The foetus was lifted out through the abdominal wound and, passing down the cord, the placenta was found attached to the posterior surface of the right broad ligament intimately connected with the fimbriated extremity of the Fallopian tube. This was removed with great care and without any hemorrhage of any consequence and the patient went on to an uninterrupted recovery, and is living to-day and has never been pregnant since. The foetus was estimated to be about the sixth month. We were never able to obtain the history of any tubal abortion from any symptoms which she described, but as she was a colored woman of not more than common intelligence, there is no doubt but that at some time she had had the severe abdominal pains characteristic of a tubal abortion, and at that time the foetus had escaped and the placental portion of the fertilized ovum had attached itself to the region where we

found it, and the foetus had grown to the size as discovered in the operation.

In the rupture of the tube various conditions may happen, and these largely depend upon the portion of the tube involved in the pregnancy and in the rupture. When the pregnancy is ampullar the rupture generally takes place directly into the abdominal cavity, attended with a great deal of hemorrhage; when it is interstitial it may force itself down into the uterus, or it may rupture at the junction of the tube with the uterine wall and an alarming and fatal hemorrhage take place at once; if infundibular, abortion is the ordinary result. Oftentimes the rupture may take place and the hemorrhage will be confined within the folds of the broad ligament, giving rise to a pelvic hematocele. The ovum, if expelled from the tube, may grow and become encysted and a large portion of it become absorbed again; it has been known to become calcified and a lithopedion develop and form a hard, firm tumor at one side of the pelvic cavity, interfering somewhat and oftentimes very seriously with subsequent labors. Some twelve years ago the writer was called to a neighboring city to see a woman in labor in which there was an obstruction to the downward progress of the child, and was told to come prepared to do a Cæsarian section. The history as presented was that some two years before the woman had supposed herself to be pregnant, went on to term, and nothing ever came of it. She had previous to this borne a child without any apparent obstruction to its downward passage. Upon examination, the woman was found to be in labor, with a mass blocking the pelvic outlet so that at least one-third of its cavity was obstructed, which prevented the downward passage of the child. After consultation, Cæsarian section was performed and a healthy living child extracted, and from the section the mother made a good recovery. But beginning a few weeks after labor there passed from the rectum at various times a large number of bones of foetal size and structure, and I have to-day in my possession a large collection of bones from this woman, which ulcerated through from this sac or tumor which we found at the time of labor

and passed by the rectum. These bones are easily recognized and are almost sufficient to account for the bones of a foetal skeleton, showing that that woman had had an extra-uterine pregnancy which had become encysted and afterwards the disturbance of a subsequent labor had caused a breaking down of the wall and a sloughing through and passing down into the rectum of the contents of the sac.

This preliminary sketch of a subject which should have taken a great deal more space than can properly be assigned to it in a paper of this kind, leads us now to consider the greatest point of interest, and one of the most practical consequence to us all, whether we be general practitioners or operating surgeons, and that point is the diagnosis and treatment of ectopic gestation.

Keeping constantly before us in our minds what is going on in this condition, we will have various things presented to us for our consideration. The fact that a pregnancy has taken place will naturally cause a perversion of the menstrual function. The changes in menstruation will not be similar to those which occur in a normal uterine pregnancy, but there will generally happen a missed period, followed at a greater or less interval by the appearance of an irregular flow from the uterine cavity, simulating menstruation and often simulating the flow which precedes an abortion. At the same time the growing ovum begins to cause some distention of the tube, which is attended with considerable pain, and this pain is of a localized character. The ordinary symptoms of pregnancy in the breast and in the stomach are generally lacking. In making an examination, one will notice that the condition of the cervix and of the uterus is not materially changed. The uterus may be somewhat larger, and especially so in those cases where quite a decidua has formed, but generally the change is not sufficiently marked to be of very much aid in the diagnosis.

As the case progresses, however, the symptom of pain becomes more prominent. It is a question as to whether this pain is due altogether to the distention of the tube, or to small hemorrhages taking place within the caliber of the tube, caus-

ing pressure. It is noticed that oftentimes these attacks of pain are followed by feelings of faintness and collapse, which is accounted for by the amount of hemorrhage which takes place and possibly by the escape of blood through the fimbriated extremity of the tube into the abdominal cavity. These pains are generally localized and referable to the position of one or the other tube.

Dr. Philander Harris of Paterson, N. J., read a paper before the Section on Obstetrics and Diseases of Women at the 1907 meeting of the American Medical Association in which he ingeniously divided the condition into two stages, called by him the tragic and non-tragic stages of tubal pregnancy.

In the non-tragic class he placed those cases which occur before rupture and hemorrhage have taken place. In the tragic class those cases in which rupture and hemorrhage have taken place.

On the question of diagnosis of extra-uterine pregnancy he laid down as one of his important guides the following rule:

When any woman after puberty and before the menopause, who has menstruated regularly and painlessly, goes 4, 5, 6, 8, 10, 15 or 18 days over the time at which menstruation is due, sees blood from the vagina differing in quality, color, quantity or continuance from her usual menstrual flow, and has pains, generally severe in one side of the pelvis or the other or possibly in the hypogastric region, ectopic gestation may be presumed.

He claimed as his very strongest points in diagnosis the atypical character of menstruation, the irregular flowing, and the character of the pains. The flowing is often irregular and intermittent, and varies greatly in quantity, sometimes amounting to quite profuse hemorrhages, and in some cases shreds of decidua are cast off from the uterus and are found in the flow. Harris claims that after a long experience he thinks that the blood has a peculiar characteristic which offers a slippery consistency as it is felt by the examining finger. Of this I am not at all sure, as it has never been in my experience a noticeable factor. But it is a fair proposition to consider, in the event of a history of a skipped period, the appear-

ance of an irregular uterine flow following the presence of pains differing in character from the pains of an ordinary pregnancy or the pains of a threatened abortion, which pains are referable to one or the other side of the pelvic cavity, the absence of the characteristic signs of pregnancy in the breasts, the lack of stomach symptoms and a vaginal examination disclosing an absence of a symmetrically enlarged uterus and the detection by examination of an enlarged tender mass on either side,—it is, as I have said before, a fair proposition to consider that a tubal pregnancy exists.

It is necessary, however, in making this diagnosis, to take into consideration the fact that we may be deceived by other conditions which simulate the condition under discussion. We may mistake this condition for a single or double salpingitis, or a threatened abortion from a uterine pregnancy.

The physical examination will reveal conditions very similar, but as a rule salpingitis does not disturb the menstrual function. Yet, I recall very distinctly one patient, seen a number of years ago, in which there was a disturbance of the menstrual function, some enlargement of the uterus, marked pain and tenderness as to one side of the uterus, and symptoms of such a nature that I felt warranted in making a diagnosis of tubal pregnancy. The abdomen was opened and the diagnosis of tubal pregnancy had to be abandoned for one of plain pyo-salpinx, and the tube was removed with an uneventful recovery.

The tragic stage, as described by Harris, must include all of those cases in which the process has gone on and rupture of the tube has taken place, with expulsion of its contents into the abdominal cavity.

In this class we must consider symptoms of a much graver nature. We have the attack of severe pain, often causing the patient to suffer a collapse, or symptoms of shock and internal hemorrhage, and the feeling of a soft boggy mass in the pelvis, posterior or to one or the other side of the uterus.

We now must consider the treatment of ectopic gestation. It is within the memory of the writer of this paper when

various expedients were advocated for the treatment of this condition when a diagnosis had been made. The treatment in vogue consisted of attempting the destruction of foetal life by the application of strong currents of electricity, trusting that the death of the foetus would lead to an absorption of the products of gestation, and thus recovery might take place. At the present day I can conceive of but one treatment for ectopic gestation—and that is, operation.

There is no question but what tubal abortion and sometimes tubal rupture within the folds of the broad ligament takes place without symptoms severe enough to cause even a diagnosis to be made.

In my own experience I have seen two cases in which, upon operation, I found evidence of tubal abortion and ruptured tubal pregnancy, and no history could be elicited from the patient which would warrant the condition to have been diagnosed at the time of its occurrence. In one case, operating for what was considered diseased tubes, I found the remains of a large pelvic hematocele within the folds of the broad ligament. In this case there was no history which the patient could give of any attack which at any time would have led her physician, or even myself, to the diagnosis of tubal pregnancy. In the other case there had been an absence of menstruation, a supposedly illegitimate pregnancy, a visit to an abortionist, the introduction of catheters into the uterus, an irregular flow without the discharge of any products of conception, followed by a rise in temperature and the appearance of thickening in the right side extending up nearly to Poupart's ligament, with the temperature and pulse corresponding to general infection. Obtaining this history from the patient, noting the condition of the pulse and temperature, feeling the soft fluctuating mass just above Poupart's ligament, I made the diagnosis of a pelvic abscess and cut down upon it with the idea of evacuating the pus, when, much to my surprise, the opening through the peritoneum caused a welling up of a large amount of free blood from the peritoneal cavity, which compelled me instantly to enlarge the opening, pass my hand into the pelvic cavity, pull

up the right tube, sponge out the blood clots and put in drainage, and the patient made a good recovery.

I quote these cases briefly in order that it may be evident that my personal experience does not lead me to the belief that the diagnosis of ectopic gestation is the simplest thing in the world. Possibly others more acute might have diagnosed these cases correctly, but I certainly failed to do so.

It has been my good fortune, however, in several cases to be able, from the characteristic symptoms they have described and by feeling a tender mass in the region of the tubes, to make a diagnosis of ectopic gestation and to open the abdomen and confirm the diagnosis before rupture has taken place.

In one very interesting case which happened within a couple of years, the diagnosis was made, the abdomen was opened, and at the time of the operation the patient was actually having a tubal abortion; about one-third of the mass had come out through the fimbriated extremity of the tube, there was quite an amount of free blood in the abdominal cavity, but the structure of the tube was intact, and in a case operated upon very recently we were able to make the diagnosis from the symptoms, and found the tube, with the ovum inside, unruptured. Unfortunately the wall was broken through while we were taking it out, so that we could not preserve the perfect specimen, but no hemorrhage had taken place.

It is not, however, our general good fortune to see these cases early enough to make a diagnosis and to operate before rupture takes place. Generally we are called to them after rupture has taken place and they are in the tragic stage of the condition. Then comes the point as to when to operate.

There has been within the past two years a great deal of discussion by operators of marked ability on this very subject. There have been quite a number of experiments performed, notably those by Dr. Hunter Robb, in which he divided the blood vessels supplying the tubes and, as far as he has been able to observe, no deaths have taken place from the hemorrhage itself.

In my own experience I have never seen active hemorrhage taking place at the time of the operation, and I am quite firm

in the belief that the condition of shock and collapse in which we find our patients when we see them is the result of the sudden pouring out of a large quantity of blood into the peritoneal cavity, and the shock of the rupture or the shock of the abortion, as much as it is the active hemorrhage which puts them into that condition. It seems to me that with a patient pulseless, in a condition of profound shock, no matter how expert you are as an operator, no matter how quickly you can get the work done, that it is an error to add to that shock already existing the additional shock of an anæsthetic, and the necessary manipulation to bring up the tube and ligate the affected portion and clean the blood from the peritoneal cavity. I am free to say that this is a change of opinion on my part from my attitude of several years ago.

The only regrets I have in my work are regrets that I operated immediately in the face of shock and hemorrhage in the cases which I saw some years ago. Since I have changed my mind and since I have tried, and generally succeeded, in rallying the patients from the profound shock in which they are found, sometimes allowing twelve hours to go by, sometimes twenty-four hours to go by, and sometimes even as much as thirty-six hours to go by from the time of the original collapse, my results have been more satisfactory, and I can and have saved cases, by waiting this length of time and then operating, which by the old method I certainly should have lost; and I fully believe that the majority of the best operators in the country, while they admit that the results were good under the old methods, will acknowledge that the results are better when they allow their patients to rally from the shock before attempting the operation.

In one case occurring within this past year have I departed from this method of procedure. That particular case, while she was beginning to rally from the original shock very promptly, began a renewed hemorrhage, her pulse suddenly began to flicker, she was seized with another attack of faintness and collapse, and although transfusion was carried out during the operation, the patient succumbed twelve hours after the operation.

I would then say, in conclusion, ectopic gestation is not rare.

Many cases go on to tubal abortion and recover without attention.

Diagnosis is often very difficult.

When diagnosis is made, operate before rupture.

When rupture has occurred, allow the patient to rally and then operate.

DISCUSSION.

DR. OTTO G. RAMSAY (New Haven): This is an extremely interesting paper and many points have been well brought out. The first of these that strikes one is the difficulty in diagnosis spoken of by Dr. Ingalls. I am sure that all of us have found that in most cases the diagnosis is without question, but that in a fair proportion of instances the diagnosis is extremely difficult. The irregular hemorrhage seems to be one of the most marked differential points, and this is one of the things that one wants to remember when a woman complains of irregular hemorrhage. I have had two cases in which the woman was curetted before coming to me. Both these cases were tubal pregnancies which had ruptured either before the curetting or at that time.

The point regarding the nonexistence of active hemorrhage at the time of operation is also interesting. I am sure that Dr. Ingalls is quite right regarding this in many cases. Whether this is due to the anæmia of the patient, or to clotting I do not know.

As to waiting in all cases for recovery from shock, I am not sure about it, because I have seen one or two instances in which the hemorrhage caused death before an operation could be done. Last week, I operated upon a woman who was almost collapsed. I was able to do the operation without anæsthesia and there was no shock from it. She recovered a few hours afterwards. The danger of the commencement of a new hemorrhage must also be considered. In one case, I waited a week, when the patient had another hemorrhage from which she nearly died.

If one could make the differential diagnosis between tubal abortion and tubal rupture, there would be no reason why one should not wait in case of tubal abortion for recovery; but in tubal rupture one cannot operate too soon. You have doubtless heard the story of the French actress who, on getting out of her carriage, fell dead, and it was found that there had been a tubal rupture. The sooner you operate, in the majority of cases of tubal rupture, the better. The operation must be immediate, or a certain proportion of such patients will die.

DR. NORTON R. HOTCHKISS (New Haven): The subject of extra-uterine pregnancy is exceedingly interesting to all physicians. The question of diagnosis is, of course, the one important thing in connection with it. I have had an opportunity to see three cases recently. These were extremely interesting, not only from the diagnostic standpoint, but also as to their results as shown by operation.

One of these cases was sent into the hospital with a diagnosis of pelvic abscess. Examination showed the pelvic cavity and cul-de-sac to be filled. The history of the case corroborated the diagnosis made before admission. Before opening the abdomen, I opened into the cul-de-sac, where I found a lot of blood and from which I removed about a quart of broken-down tissue. I then opened into the abdomen and removed the ruptured tube. The question of diagnosis in this case was certainly interesting.

The second case occurred in my own practice, and I had the pleasure of having Dr. Ramsay in consultation. The patient had practically no symptoms. She had gone over the regular menstrual period only three or four days and begun to have a little central pelvic pain. After several days, she was seized with 'profound shock. I was hurriedly sent for and found her apparently dying. She was very anæmic, extremely ensanguinated, and almost pulseless. The supposition was that there was a hemorrhage from a ruptured tubal pregnancy. Nothing, however, could be done for forty-eight hours. Dr. Ramsay and I found a freely movable floating mass in front of the uterus, slightly to the right, and we concurred in the diagnosis. The patient went five or six days, under saline enemata, heart tonics, and stimulants, before we dared do anything. We then operated. There had been no rupture, but simply a bleeding from the fimbriated extremity.

The third case was that of a woman who had been married ten years, but had never conceived. She had had practically no cessation of her menstrual periods, though she was inclined to be irregular, sometimes going two or three days over the time and sometimes having the period come on too soon. She was taken with pain in the left side and fever. We found a large uterus, which appeared to be three or four months pregnant. On the left side there was a fluctuating mass. She was operated upon, and we found an interstitial fibroid tumor of the uterus and a ruptured tubal pregnancy of the left side. Such cases are very interesting.

DR. JAMES J. BOUCHER (Hartford): I question very much whether a case of primary abdominal pregnancy ever occurs, at least it has never been proven that such a pregnancy has taken place, always being secondary.

Tubal pregnancies terminate in one of two ways, either abortion or rupture, the former in about 75 per cent. of the cases, and is the safest of all terminations.

Regarding treatment, I must disagree with those who say that all cases should be operated upon at the earliest moment after seeing them. We should not lose sight of the fact that surgery will not cure all, and when these patients are in a condition of profound shock it would seem to be better judgment to assist nature to bring about a reaction, and defer surgical procedure until such time as it will be likely to offer at least a fair chance to the patient.

Why should we expect more favorable results by operating in a condition of shock following ruptured tubal pregnancy than in the case of shock following any other injury? Only about five per cent. of these cases are immediately dangerous to life from hemorrhage and in these cases will be chiefly concerned as to the best procedure to follow. In each of these latter we will be obliged to judge and treat each case upon the condition presenting when seen, and this is a matter which will be almost an impossibility to outline in advance,—it must be largely one of experience. In cases of profound shock it would seem that little would be accomplished by operating. It has been amply demonstrated that a patient can lose 3 per cent. of the body weight in blood and still recover. That shock takes place almost immediately after the occurrence of rupture and before time has elapsed for much hemorrhage to take place is pretty certain, so that something else than hemorrhage must be productive of shock.

Ectopic pregnancy is an important subject. The condition occurs in about one per cent. of all pregnancies and in about seven per cent. of all laparotomies. Many cases are mistaken for miscarriages, and in every case of supposed miscarriage I believe one should personally observe the foetal structures or satisfy themselves by pelvic examination that no tubal pregnancy exists.

DR. PHINEAS H. INGALLS (Harford): There is but little for me to say. I thank the gentlemen for the way in which my paper has been received.

In regard to Dr. Ramsay's criticism, I would say that I hope he did not understand me to mean that I postpone operation after hemorrhage too long. All these cases must be operated on; but I wait to have the patient rally only sufficiently to be able to stand the operation. There may be a liability of fresh hemorrhage at times, or a speedy infection of the contents left behind. You must get them out as quickly as possible with safety to the patient.* We should not operate in the face of profound shock, but should give the patient a chance to rally and then remove the contents.

The Importance of More Careful Surgical Diagnosis and the Aid Afforded by Various Tests.

HARRIS F. BROWNLEE, DANBURY, CONN.

The subject of this paper was suggested to me by the very able and efficient Chairman of the Committee on Scientific Work, who, by virtue of his geniality and general worthiness, commands my respect and effort at compliance.

I think the subject fitting at this time, for I believe it a fair impeachment to say that outside of the large surgical centers, the art of surgical diagnosis does not approach that degree of exactness which is both possible and desirable.

Surgery, after a period of brilliant and world-wide advancement over several years, has reached a point where results are being summed up and carefully scrutinized. We see in the surgery of to-day, both in its practice and its literature, a tendency toward a more orderly progress; not a lessening of effort or the feeling that the height of discovery or of perfection has been reached, but an effort, by careful and unbiased review, to eliminate the fallacies, and to concentrate the efforts of the whole united profession toward perfecting those measures which have proven of value and for still greater conquests.

We see the foremost surgeons of the day going over their past work and publishing their errors as freely as their successes, and it is by this fair-minded adjustment that surgery will in time have its indications and limitations fairly outlined and become a more exact science.

One of the greatest evils in the practice of surgery to-day, one which contributes most to divisions of opinion between surgeons and physicians, between both and the public, is that of hasty, illogical, inaccurate, or entire absence of diagnosis. There is no field in either medicine or surgery more worthy of careful cultivation than that of diagnostics. Physicians and

associations of laymen may differ as to the treatment of disease; surgeons may differ as to the method or advisability of operation, but the man who makes an accurate diagnosis is independent of all strife and lays first claim to the appreciation of his patient and the respect of his colleagues.

This is appreciated in the larger surgical centers, where every effort is made to solve out a case to its last point of interest before the patient is submitted to operation or handed over to an exploratory incision—that valuable but much abused procedure. Outside of these large centers I believe the percentage of inaccurate and faulty diagnoses to be very large, and I believe if the statistics of all the surgeons throughout the country could be laid bare, they would exhibit an appalling number of mistakes with a considerable loss of life. This charge does not by any means lie wholly at the feet of the surgeon, for very often the fate of the patient has been decided long before the surgeon is asked to see the case. We can all recall great numbers of moribund cases, long since past the point where surgical interference should have been asked.

It becomes just as important that the general practitioner should become a better diagnostician as for the surgeon, not only that he may promptly recognize surgical conditions and avail himself of aid in the face of imminent danger, but that he may be able to hold the surgeon up to a more exact knowledge of the conditions; for while we see many cases lost by dilatory proceedings, I am frank to say that many times the surgeon is found making excuses to his colleague for an error of judgment or a faulty diagnosis.

The factors leading to this condition are, first, the real difficulty in many cases of arriving at a true and accurate diagnosis. Even in the great teaching centers, where skilled men take the histories, make the examinations, and apply all known tests, there are still some cases unsolved and the true diagnosis only made at operation, or by later developments where no operation is done, and it is not to be wondered at that, among men removed from these centers, where frequently the assistance of the laboratory is not easily available and the

number of similar cases are divided by longer intervals, errors should be frequent and many remain undiagnosed. But many of these errors can be avoided and must be, if we are to occupy the place of distinction to which we aspire.

A careful, painstaking history of the case is first of all of most importance, and where we most often fall down, being misled frequently by the patient's own statements. More skill and intimate clinical knowledge is often necessary in getting this history than in making an examination. Illogical deductions may be made from accurate facts, but more often logical deductions are made from inaccurate facts, both leading to error in judgment; and these errors of judgment, however they may be arrived at, not only mean much to the patient who has confided himself to our care and furnish deadly ammunition to our enemy, the Christian Scientist, but they also hurt our pride; they destroy one's feeling of fitness; they dull the fine edge of the success we experience in other cases, and they make us limp a little when we would walk boldly erect.

It is not my privilege to take up in detail the art or science of surgical diagnosis. It is at once an art and a science; also, as one of our great surgeons has expressed it, an intuition, though I believe the intuition to be derived by a subconscious association of similar cases which, without direct process of reasoning, leaves an active impression upon a diagnostician's mind and influences his summary of subsequent cases.

I am asked to take into consideration the various tests available which may be of serviceable help in making a surgical diagnosis. With this end in view, I have added to my own knowledge by going through a quantity of recent literature and taken some pains to find out what tests were in general use in some of the hospitals of the larger cities. In this I have been aided, and here wish to acknowledge my indebtedness to Drs. Cassius Watson of Brooklyn, Lewis Gregory Cole of New York, and Orin Witter of Hartford. It is quite impossible to consider all of the tests in use or suggested in one paper, and I select only the important ones and will treat them in the briefest possible detail.

Blood Count.

Probably the most important test in process of development at present as an aid to surgical diagnosis is the blood count. The enumeration of the leucocytes contained in a specimen of blood and the relative number of a certain variety, the polymorphonuclears, as indicating the presence at some point in the body of a localized inflammation and demonstrating the effort of the body by its natural processes to overcome a foreign invasion.

The leucocyte count, both absolute and differential, is certainly coming to a point of better understanding. We know that in certain inflammatory conditions we have an increase in the number of leucocytes, also an increase in the relative number of polynuclears. By estimating the absolute number of leucocytes and the number of polynuclears and then estimating the relative increase, we have three strong points of information which may be of great help in doubtful cases.

The literature upon the subject is becoming so general that it is unnecessary for me to go into details. The salient points, however, are interesting, as the test has suffered in repute and been slow of adoption through lack of understanding.

The fact should be emphasized that the leucocytosis is diagnostic of an active inflammatory process and not of an established condition. That is, during an attack of localized inflammation, from the very beginning there is an increase in the leucocytes and a relative increase in the polynuclears, and this increase of both continues in a rising scale up to the point where the inflammation begins to subside *or*, where the tissues give up the struggle and are overcome by destruction, breaking down into a gangrenous mass or abscess. This latter condition for a long time deceived us. Because we did not find a marked leucocytosis or relative increase in the polynuclears in our worst cases of gangrene or abscess, we denounced the whole test as unreliable, while the fact was that we were too late with our quest of knowledge. The psychological moment in which we might have found the struggle of the tissues at

their height and interfered to prevent the terminal condition which followed had passed.

The principal point appears to be the estimate of the percentage of polynuclears. A polynuclear percentage of 90 or more indicates a severe process requiring immediate interference; a percentage below 78 inferring a mild process; supposing, of course, that the estimates have been made early, before the tissue reactions have ceased, or at least lessened. One count is not always sufficient any more than one examination of any sort. Comparison of the findings with those of the previous day are often of great value in doubtful cases. This test is probably of greatest value in the diagnosis of appendicitis and acute gall bladder affections. It is not only helpful in demonstrating the inflammatory process, but in estimating the progress from day to day; a relative increase of polynuclears indicating the success of the bacterial invasion and a decrease indicating, for the time at least, a victory for the leucocytes.

In a typical case of appendicitis, or empyema of the gall bladder, the clinical picture is so plain to the careful and experienced examiner that a blood count is of little or no importance, but in certain atypical cases the diagnosis is not always clear and this test is certainly helpful. Last month a young girl was sent into the Danbury Hospital from a neighboring town with a diagnosis of typhoid. At first thought this would appear as a very foolish diagnosis, but examination of the case and listening to the girl's statement of her history, made it seem not so improbable, though I did not agree with the diagnosis. A blood count of 22,000 furnished evidence, and operation the same day the proof, of a diffuse septic peritonitis originating from the appendix. The blood count in this case was valuable evidence and served to convince not only me but the man who sent her in.

The blood count helps to differentiate

- (1) Intestinal colic.
- (2) Crises of locomotor ataxia.
- (3) Impaction of feces.

- (4) Gallstone colic (if no infection).
- (5) Renal colic (if no infection).
- (6) Ovarian and pelvic neuralgis.
- (7) Floating kidney.
- (8) Extra-uterine pregnancy (Eisendrath).

Digestive Tract.

In our search for malignant disease of the digestive tract we are aided materially by chemical analysis of the stomach contents, both after fasting and after the administration of test meals. We have here to distinguish between cancer, simple ulcer, pyloric obstruction, gastroparesis, chronic gastritis and other conditions presenting symptoms referable to the digestive tract, the actual lesion being elsewhere.

The most important of this latter group are probably the neuroses. If someone will devise a reliable test by which the neurotics can be at once diagnosed, he will confer upon the profession of surgery an everlasting blessing. While the cured neurotics have perhaps made reputations for some blundering or floundering surgeons, they have done more to spoil the conceit and confidence of many intelligent and careful operators than anything of which I happen to have knowledge.

I will not here go into the differential tests useful in the solving of this complex and interesting set of digestive conditions, as they are to be found in any standard text-book, but will call attention to the particular finding referable to cancer, as it is in these cases that an early diagnosis is the only thing of avail in treatment. Cancer of the digestive tract is as amenable to treatment as cancer in other parts of the body, if it can be diagnosed as early, and it can only be done through laboratory tests.

Cancer is a disease beginning as a small accumulation of cells, microscopic in character, and for a considerable period of its development presents very few symptoms, subjective or objective, which afford much real information. If a laboratory diagnosis of the case can be made before the disease has progressed sufficiently to present other symptoms, that is just so

much to the advantage of the patient and to the credit of surgery, as it adds in just proportion to the operative success in these cases.

First and most important is the presence of blood in the stomach contents. This is nearly always present in the ulcerative stage, but in such small quantity as to be discoverable only by the microscope, what is known as "occult blood," and is seldom seen in sufficient quantity to be evident to the naked eye as blood. This is demonstrated by gently aspirating the stomach content, using great care not to abrade the stomach wall, which may easily cause a plain show of blood. It is not necessary to empty the stomach, a small amount being sufficient. When blood is present constantly after several examinations, it is more liable to be cancer than ulcer. Occult blood is found very early in a large percentage of cases. The absence of it does not exclude cancer, but is strong evidence if persistent. In about 50 per cent. of cancer cases blood is never vomited during the course of the disease, but in many of these microscopic blood can be found early. Occult blood may be also detected in the stools and is of even greater significance than when found in the stomach. This is demonstrated by a variety of tests, the best of which appears, according to Isler, to be the guaiac, aloin and benzidin test.

Pus cells, or groups of cells, indicating an ulcerating surface, is sometimes noted and an increase of bacteria, particularly if one kind predominates, is also suspicious.

Hydrochloric Acid.

The hydrochloric acid test has become rather better known than many others and is more widely used, perhaps on account of the ease with which an approximate estimate may be obtained.

The popular idea is, I think, that it is usually absent in cancer cases. This is not borne out by the literature of the test, but frequently good information may be obtained by estimating the amount of free hydrochloride in suspected cases. At first the hydrochloric acid is slightly increased, due to the

irritation of the growth or its toxins, a point to be borne in mind. Sudden drops in the amount of acid after such a rise is indicative, as is also a steady decrease, as shown by succeeding tests. A steady decline and final disappearance is followed sufficiently often by a palpable tumor to be of ominous significance, though in some cases of cancer the acid persists to the end. The presence of lactic acid and absence of hydrochloric is even more conclusive.

Solomon's Test, the description of which is omitted, is often positive and may be an additional straw to grasp in solving a puzzling case.

Weight.

It is proper to add here that a continued steady loss of weight accompanying certain classic disturbances of digestion is a test not to be ignored and does not require great skill in determining.

Hemolysis.

Dr. George W. Crile has presented recently an interesting study in hemolysis, showing the effect of the serum from the blood of cancer patients upon normal corpuscles, endeavoring by this method to diagnose malignancy in some portion of the body. His results are encouraging, but not yet specific.

Cambridge Test.

There is a very serious class of cases with which we are not altogether familiar, namely, the inflammations and diseases of the pancreas. The symptoms are closely allied and frequently associated with those of gall bladder disease, this association being contributed to by the frequency with which the ductus communis choledochus traverses the head of the pancreas, about 62 per cent., disease of one organ leading to disturbance or actual disease of the other. Without going into minute description of symptoms, it is sufficient to say that those of acute pancreatitis, or acute exacerbations of chronic disease, may resemble those of common duct obstruction, or

even those of Ileus. In either case the effect upon the system of the diversion of the pancreatic secretions into the blood current is profound and, especially in the hemorrhagic form, immediately serious. These conditions yield as readily to surgical treatment as do those of gall bladder affections, if they can be diagnosed.

An abundance of literature is accumulating which goes to prove the accuracy of the Cammidge test. The fat necrosis which takes place when the pancreatic secretion escapes into the tissues is shown by the presence of certain crystals in the urine, and the demonstration of these bright yellow sheaflike crystals, more or less covered with bright red spheres, constitutes the Cammidge test. The test is too academic for description in this paper or for application by the surgeon. It is sufficient to say that a case presenting suspicious symptoms may have some light, positive or negative, thrown upon it by sending a pint of urine to a well-equipped laboratory. The test does not distinguish between acute, chronic or malignant disease of the pancreas, but simply the fact that fat necrosis is in progress, and this does not occur in any but pancreatic disease.

Some beautiful illustrations of the crystals are shown in an article by Milton R. Barker, published in the *Record*, November 21, 1908. The increasing number of reported cases where the Cammidge test has been positive and the result proved by operation, leads to a very favorable consideration of this test.

Again, this test is useless in the acute fulminating cases, unless you are in very close touch with a laboratory, as the necessary time lost in obtaining the information could be better employed if you are fairly sure of the diagnosis. But there are a large number of cases presenting definite attacks of pain in the biliary region which are not clear as to their causation, even presenting serious symptoms. Where there is plenty of time for more deliberate investigation, a positive or even a negative Cammidge test would add to the knowledge of the case.

Urinary Tract.

In the diagnosis of affections of the urinary tract we have, as a preliminary to any test with surgical application, the separation of the urines from the two kidneys; either by apparatus dividing the bladder into separate chambers, or by the better method of catheterizing each ureter. By this means we are able to examine the exhibit from each kidney and draw conclusions. Besides the ordinary finding of albumin, sugar, casts, pus, blood, and bacilli, etc., etc., we seek to discover the individuality of each kidney, its physical condition and functional activity. By the administration of methelene blue (by mouth) or indigo carmine (intramuscularly 4 per cent.) the functional activity of the two kidneys may be determined and compared, except in cases of horseshoe kidney, where of course it is valueless. We may test functional activity also by the

Phloridzin Test.

With ureteral catheter in the pelvis of the kidney 20 M of a 1 per cent. sol. of phloridzin is injected intramuscularly. Should sugar not appear in the urine from that catheter in from fifteen to thirty minutes the kidney is not excreting rightly.

Electric Conductivity.

A decreased electric conductivity after intramuscular injection of indigo carmine also demonstrates inefficient function. A decrease beyond 20 ohms means a surgically unreliable kidney.

Cryoscopy.

By determining and comparing the freezing point of the blood and urine, known as cryoscopy, we are also able to test the kidney function.

Röntgen Ray.

Regarding the Roentgen ray as an aid to diagnosis, I addressed a letter of inquiry to Dr. Lewis Gregory Cole of New York, a recognized expert in this branch of diagnostics,

asking him for an opinion of the present status of the X-ray as an aid to correct diagnosis. I will embody his reply, which appears to cover the ground very fairly. Dr. Cole says:

I will mention the different conditions under which the X-ray gives absolute correct diagnosis when the plates show sufficient detail and are interpreted by one familiar with the work. Following is the list:—

Localization of foreign bodies.

All bone lesions, especially syphilitic, sarcomatous and osteomyelitic, and tubercular joint lesions, and especially osteo-arthritis.

Frontal sinus infection.

Enteroptosis. Gastropptosis. Chronic obstruction of the colon, especially post-operative adhesions.

Renal, ureteral and vesicular calculus.

Abscess of the lungs, pleurisy and empyemas and incipient tubercular infection of the lungs.

Tubercular infection of bones and joints.

All these conditions can be very definitely diagnosed by the X-ray.

The following conditions may, at times, be diagnosed but one is not justified in making a negative diagnosis of these conditions even if the plate does not show them to be present:

Separation of the epiphysis.

Gall-stones.

Carcinoma of the stomach.

In cases of separation of the epiphysis, the lesion can only be shown by comparing it with the normal part. If the separation is greater than in the normal side one is justified in a positive diagnosis. On the other hand if it is not greater one is not justified in making a negative diagnosis.

Gall-stones may be shown if they contain a sufficient amount of calcareous deposit, but one is certainly not justified in making a negative diagnosis should the radiograph be made and fail to show them to be present and it should not deter them from operative procedure providing there were sufficient symptoms. On the other hand I believe that a surgeon is not justified in operating for stone in the genito-urinary tract when radiographs of sufficient detail to justify a negative diagnosis fail to show one to be present.

Brain tumors may be shown if their density is positively different from the tissue surrounding them.

In going over this list we see that many of them can be fairly well diagnosed by a painstaking examination after a

complete and careful history, but the assistance of the X-ray is one of the greatest aids at our command. This is particularly true in calculi of the genito-urinary tract. Dr. Cole is quite right in saying that operation is not justifiable when a radiograph of sufficient detail fails to demonstrate the presence of a calculus. I will go one better and say that operation is unjustifiable until a radiograph has been taken by a competent expert, the operation being too serious to be undertaken upon insufficient evidence, when it is possible to be sure, as it certainly is in these cases.

In gallstones, however, the weight of evidence is against the accuracy of the radiograph and operation must be undertaken or abandoned upon the clinical evidence. In all of the conditions mentioned by Dr. Cole a radiograph is surely advisable and will be found helpful. I must emphasize, however, that the man making the exposure must be competent and of such caliber that we can send the patient to him for an opinion rather than a picture, and let *him* assume the responsibility of the diagnosis.

Blood Pressure.

By taking and noting the changes in blood pressure we may gain information as to diagnosis and differentiation of

- (1) Meningitis—rise as exudate increases.
- (2) Cerebral abscess—marked rise as intracranial tension increases.
- (3) Sinus thrombosis—slight rise.
- (4) Concussion—no change.
- (5) Contusion—no change.
- (6) Compression—rises as pressure increases.
 - Subdural—slow.
 - In brain—rapid.

Cytodiagnosis.

By cytodiagnosis (lumbar puncture), obtaining cerebrospinal fluid for examination, we obtain information regarding

(1) Cerebro spinal meningitis—polymorphonuclear neutrophils, or lymphocytes may predominate.

(2) Tubercular meningitis—polynuclears or mononuclears may predominate.

(3) Purulent meningitis (traumatic origin)—micro-organisms and pus cells.

(4) Tetanus and cerebral tumors—no cells in C. S. fluid.

Paracentesis.

By examination of fluids drawn from serous cavities pleural, peritoneal and pericardial, we are often able to determine the character of the infection.

(1) Tubercular effusion—lymphocytes.

(2) Acute infections—polynuclears.

(3) Mechanical effusions—endothelial cells.

(4) Neoplasms—free cells in stages of division.

So much for the tests helpful and hopeful to surgical diagnosis. There are many more of lesser account. Those of us who are in close touch with laboratories and their experts can avail ourselves of their aid with much profit. All of us can at least become sufficiently conversant with them to be able to interpret their meaning. An accurate clinical history; a painstaking examination by an experienced eye and hand, afford the true basis for logical deductions and accurate diagnosis.

These tests are valuable aids, to be encouraged and not neglected, but they do not lessen the necessity for clinical observation and an exercise of common sense reasoning. I wish to say, however, with emphasis, that these tests, however helpful, do not constitute an easy short cut to accurate diagnosis. They are not the *basis* upon which intelligent diagnoses are made.

In the division of human energies, the men following any particular line of endeavor assume prominence according to their particular mentality and habit of thought. Some few are natural *investigators* and *leaders*, but most men are

followers. Some follow intelligently, and in doing so complete and improve the trail until it either becomes a broad highway of knowledge or stamped as a road to nowhere and abandoned. Others follow indifferently, blindly, or half-heartedly and do not add to the sum total of knowledge.

It is the same in surgery. We cannot all be leaders, but we can be intelligent followers, and in order that we may fulfill that office destined for the majority, it is well that we hold an occasional council and take our bearings. It is as such that this paper is presented.

REFERENCES.

- Noehren, Alfred H. The Value of Differential Leucocyte Count in Acute Appendicitis. *Annals Surgery*, February, 1908.
- Bartlett, W. A., Smith, E. E. Blood Reaction and Diagnostic Prevention of Terminal Stages of Infection of Gall Bladder and Appendix. *Med. Record*, February, 1908.
- Barker, Milton R. Pancreatitis with Illustration of Crystals of Pancreatic Reaction. *Med. Record*, November 21, 1908.
- Sahli. Diagnostic Methods.
- Butler. Diagnostics of Internal Medicine.
- L. Isler. *Centralblatt für die Grenzgebiete der Medizin und Chirurgie*, May 7, 1908.
- Eisendrath. Surgical Diagnosis.
- Cammidge. Treatment. London, 1905-06, Vol. 9.
- Med. Chir. Trans.*, London, 1905, Vol. 88.
- British Med. Journal*, Vol. 1, 1906.
- Surg. Gyn. and Obstet.*, Chicago, 1906, Vol. 3.
- Wood. Microscopical Diagnosis.

DISCUSSION.

DR. ERNEST A. WELLS (Hartford): I think that Dr. Brownlee's paper has very satisfactorily covered the most important of these various differential tests, and I do not believe that his general statements can be improved upon. I shall not attempt to discuss any of the individual tests, but shall speak chiefly in general terms.

Every physician or surgeon leads a dualistic sort of existence. Most of us have to earn our living; and the strife for self-preservation takes so much time, and we are so much interrupted by repeated calls from anybody and everybody, that we feel that we do not have time to go into the minute details of many laboratory tests. Most patients

are poor, but even if our patients have the money, they do not see the value of the time spent by experts in making these tests. Unless we practically give either our own time or take money from our own pockets to pay for the time of others, we cannot make these tests in many cases. For these reasons, there is a tremendous tendency to get along without such tests.

At the same time, everyone has, at least at times, an inspiration toward a better practice of medicine. We should like to take our cases that are interesting, work them up, and study them from beginning to end as they should be studied. It is a constant battle with the physician to break away from the temptation of self-preservation and work his cases up better.

Regarding these tests, I would remark that every few weeks there is a new one. We read as much as we can of the statements of those who have worked up particular tests and get their findings; but even then, each man has to decide for himself how valuable a test is. You can read an article that sounds as if an easy road to a diagnosis had at last been found. You try it and observe its results, and it does not work as well in your hands as it apparently did in the article. Then someone comes out with a paper that contradicts the original statements. Tests, like methods of treatment, are called to our notice with loud commendation, but soon follow the rule of the survival of the fittest. Those that are valuable survive and those that are not are gradually lost sight of.

Many tests are unjustly discredited because we do not take the trouble to but half understand them. I have heard surgeons say: "If the leucocytes go up, we will operate; if they do not, we will not operate." These surgeons were trying to find an easy way of decision and were not keeping their minds open to other things in connection with the case. No wonder then that this sign failed. There will never be a short cut to surgical diagnosis.

Hospital work is vastly more satisfactory to any physician than private practice, because of all these tests that we can have done and because of the records that can be kept. As it has been said that a bone surgeon is known by the pile of his chips, so I say that the diagnostician is known by the records he keeps. The man who is trying to become a student-surgeon will keep records, and the man who is attempting to put hospital diagnosis on a rational basis will see that records are kept. What should we know about malarial fever, for instance, if we had never had temperature charts. I heard a doctor say that he did not believe in blood-pressure charts. He could tell as well with his fingers. But this same might have been said at one time of thermometers and temperature charts. We can plot blood-pressure curves just as well as other curves, and in some cases they

will be as useful. We can plot our curves and arrive at some definite knowledge of the patient's condition. The word diagnosis means to know clear from beginning to end; to look at the case in every aspect, and look at it clear through. In this sense, the diagnosis should include also the prognosis.

DR. HENRY F. STOLL (Hartford): The use of tuberculin is of a good deal of assistance in certain conditions. Although, as stated in the paper, the reaction is of greater significance in surgical conditions than in tuberculosis of the lung, it is not much used by surgeons. The skin tuberculin test has placed tuberculin within the reach of every one. The type of reaction obtained must be considered carefully before reaching a diagnosis. In the case of children with bone difficulties, if the test is given carefully, it is of a good deal of value. If, at the end of twenty-four hours, it is negative, you can exclude tuberculosis, unless the patient is in an advanced stage of tuberculosis, is suffering from measles, or has had tuberculin therapeutically. A positive reaction, however, is not of much value. If you get a strong reaction with any other evidence of the disease, the probability is greater that the patient has tuberculosis. If, after the skin test, the subcutaneous test is given, a local reaction will be obtained in the glands of the neck or in the joint, as the case may be. Children who have had tuberculosis of the spine diagnosed, when it is simply scoliosis, would have been saved a course of treatment for the wrong condition if the tuberculin test had been employed. It is a valuable aid in surgical as well as in medical diagnosis.

In regard to the differentiation between typhoid fever and appendicitis by means of the leucocyte count, I happen to think of a case that was apparently typhoid, but the leucocyte count was 22,000. He was tender over the right iliac fossa. We learned that he had had a bath just before the leucocyte count was taken; we watched him carefully, and found that it went down soon afterward. While a high leucocyte count after a cold bath is not unusual, such a high one as this is very exceptional. The man died.

The use of orthoform in conditions of the stomach is often of value in diagnosis. In ulcer and cancer, it relieves pain; whereas, in neurotic conditions, it does not. In all stomach work, several examinations of the stomach contents should be made, not only one or two. You cannot differentiate between chronic ulcer and early pyloric cancer by laboratory methods alone.

DR. JOHN B. BOUCHER (Hartford): You will agree with me that Dr. Brownlee has covered this subject very carefully in his paper. In the time allotted to me I will refer briefly to a few points and try and show our friends from the suburban towns, who have not the advantages

of laboratories, that they are not at as much of a loss as would appear at first sight.

The first point in diagnosis is to obtain a careful history extending over months and years,—from history alone one gains the most valuable knowledge concerning a case. Histories properly interpreted by the physician throw the strongest light that we can obtain upon the subject. Our diagnosis is practically made on what the history reveals. In acute appendicitis, for example, one will nearly always obtain a history showing that the patient has had previous trouble; there is always a chill or rigor, and a careful history will show this in 95 per cent. of the cases; a history of temperature, slight in the beginning, is always present. We must not be deceived by temperature and feel that we can guide our treatment by its presence or absence, for we may have no temperature with a gangrenous appendix or an abdomen full of pus, but there is a reason for this which time will not permit me to enter.

The blood count is a valuable aid in diagnosis and should be made in all cases of inflammation of the appendix. I consider the evidence only corroborative. The percentage of polynuclears is an indication of the severity of the infection, but not the degree of destruction. A fall in the absolute number of polynuclears with a decrease in the total number of leucocytes shows a decline in infection. A sudden fall in the absolute number of polynuclears with a rise in the percentage of white cells is of unfavorable prognostic import. A very unfavorable sign is a sudden fall in the total number of leucocytes.

Dr. Brownlee referred to the X-ray. This is a valuable aid in diagnosis if handled by a man of experience, who has other means of support and can devote his time to this branch of the profession, as is done in many of the large cities, but to the average physician the X-ray is of little value. Men who have to make a living cannot do so by the X-ray alone unless supported by their brother practitioners. In a city of 100,000 inhabitants one man could do all the X-ray work of the town and make a living, but there are usually forty trying to do it and none doing it well. The X-ray should be a valuable aid in kidney disease, ulcers of the stomach with hour-glass contraction, etc. While it is true we have some advantages in this line, we have not and will not have its full advantages until the work becomes concentrated. No one man can do it properly.

Dr. Brownlee referred to one point about which I must disagree a little—the laboratory diagnosis of cancer of the stomach. We cannot make a laboratory diagnosis of this condition; if made, I can safely prognosticate a funeral. The diagnosis of cancer of the stomach must be made from the clinical history if it is to be of any use to the patient. The finding of occult blood is useless, as it is found in so many other conditions. The old theory that in cancer of the stomach

there is an absence of hydrochloric acid and the presence of lactic acid is found to be absolutely unsound teaching. In speaking of this I wish it understood I am not decrying the laboratory, for every man doing surgery must use laboratory methods, and trust that the time is not far distant when they will be a valuable aid to the surgeon and general practitioner in assisting in the early diagnosis of many obscure conditions.

DR. LEONARD W. BACON (New Haven): There are only two comments that I wish to make on this paper. One is with regard to the hydrochloric acid test in cancer of the stomach. In this connection, I shall allude to some work done by one of my colleagues in New Haven, in regard to the hydrochloric acid in the stomach in cases of malignant disease of intra-abdominal organs not connected with the stomach. He has made some observations along this line, which will probably be published later.

Another thing that struck me is that in the various subjects of laboratory diagnosis, one was admitted; that is, with regard to some form of test that should differentiate for us those diabetic cases in which it is safe to operate from those that had better be left alone. The occurrence of acetone, diacetic acid, and beta-oxybutyric acid in the urine is well known, and should be taken into consideration in arriving at a decision to operate. Not only is there much diminished resistance to infection, so that any septic process, added to the shock of the operation and the anæsthetic, is apt to provoke diabetic coma. The question of operation resolves itself into that of how we can determine the imminence of diabetic coma. By the results of treatment, it has been determined that it is largely an acidosis. The diminished alkalinity of the blood can be combated by administering large doses of alkalis, by which patients, even in full diabetic coma, have been brought through their difficulty. A reasonable guide to the imminence of diabetic coma would be the estimation of the total ammonia in the urine. The appearance of a large amount of ammonia in the urine is indicative of the fact that the acids that are circulating in the body fluids are ready to combine with the ammonium base before the ammonium can be changed into urea. A large content of salts having an ammonium base is a useful guide as to the propriety of operation. There is a method of estimating the total ammonia which is not too elaborate for ordinary laboratory use. Any laboratory that could carry out the Cammidge test could do it. It is called McFarland's test.

DR. L. M. GOMPERTZ (New Haven): Time will not permit me to discuss this paper as much as I would like to. In response to Dr. Brownlee's question as to the differential diagnosis of stomach dis-

orders in the neurotic and a beginning carcinoma, I believe that the clinical history and the examination of the stomach contents to be of value. In the neurotic, the variations in the gastric acidity are considerable; at one time finding a high acidity and at another time a reduced acidity. However, the ferments, rennin and pepsin, are always the same. In carcinoma the ferments are reduced or absent.

Dr. Boucher made the statement that if cancer of the stomach is operated upon as the result of laboratory findings, he could predict a funeral. We have had fourteen cases operated upon and there are fourteen live people to-day. Microscopical examination of the tumor was made in all these cases. The important point is to take the clinical history in conjunction with the microscopical examination, and the chemical tests.

A test not mentioned by Dr. Brownlee is the microscopical examination of the contents of the fasting stomach. The patient is given a test supper containing meat, rice and raisins. The patient comes to the office on a fasting stomach and a stomach tube is passed. If obstruction of the pylorus is present we get the remnants of the food taken the evening before. The stomach is then washed out and the test breakfast described by Ewald is given. This is allowed to remain in the stomach for one hour and the chemicals are then applied. If there is evidence of obstruction, and absence of free HCl, a low total acidity, and the ferments reduced or absent, we may be pretty sure that there is cancer of the pylorus. If Dr. Boucher will try these tests, I think that he will become satisfied of their value.

DR. GEORGE J. BAILEY (Hartford): I want to say just a word about a case that the case of Dr. Stoll brought into my mind. The patient was a nurse who had been attending a typhoid patient out of town for three weeks. It was a difficult case, with extensive diarrhoea and bronchial affection also, and one that, unless special care were taken, would be likely to infect anyone nursing it. The nurse came back to the hospital and I saw her four days later. She had a high fever and was put to bed. The temperature ranged from about 104.4 to 102.4°. There was some tympanites, dry tongue, and some tenderness over the abdomen. She complained of hemorrhoids, but I did not make an examination, though I asked her whether she had had them previously. She said that she had had a slight attack. They said that the blood count showed 42,000 leucocytes. The next day it was 22,000. She still complained of the hemorrhoids. There was a positive Widal reaction. I ordered cold water rectal injections for the relief of the hemorrhoids, and in using the nozzle of the syringe, a rupture of a rectovaginal fistula was produced and the typhoid disappeared. The temperature went down to normal within twenty-eight hours.

DR. JAMES J. BOUCHER (Hartford): I was rather impressed by the statement of Dr. Gompertz concerning his fourteen cases of cancer of the pylorus, with fourteen recoveries, and I want to congratulate the doctor upon his record. Such results as he reports stand alone, as I am sure no one has ever been able to report such a record heretofore. As I understand the doctor, he made the diagnosis in all of these cases from the laboratory findings, and maintains that he can determine by this method the pathological condition in time to advise the patient surgical treatment sufficiently early to effect a cure.

In this connection I want to cite a case that I had the good fortune of seeing some time since in the hands of one of the masters, in which the stomach analysis showed the presence of lactic acid while an exploratory operation showed the condition to be one of benign ulcer of the stomach. I will admit that laboratory findings are helpful, but not by any means positive, and if we depend upon making a positive diagnosis by this means, in all cases, we will see the undertaker perform the last rites in some of the cases. Again I want to congratulate the doctor upon the wonderful results that he says he has obtained.

DR. HARRIS F. BROWNLEE (Danbury): I am pleased with the amount of discussion that my paper has elicited and with the acute rivalry between the Hartford and New Haven diagnosticians. If the paper had been shorter, I should have been able to bring out more clearly that these tests are not a necessity.

I believe, with Dr. Boucher, that a careful examination, the history, and good common sense deductions are the true basis of surgical diagnosis. We should be able to interpret the meaning of these tests; and when we have time, inclination, and money to spend, we shall profit by having the gentleman of the laboratory do what he can.

Hereditv and Crime.

A STUDY IN EUGENICS.

BY

WILLIAM H. CARMALT, M.D., NEW HAVEN.

"Each of us is but the footing-up of a double column of figures that goes back to the first pair. Every unit tells—and some of them are plus and some minus. If the columns don't add up right, it is commonly because we can't make out all the figures."

"There are people who think that everything may be done, if the doer, be he educator or physician, be only called 'in season.' No doubt,—but in season would often be a hundred or two years before the child was born; and people somehow never send so early as that."

O. W. HOLMES.

Although the subject matter of this paper has been a topic of somewhat perfunctory interest to me for a long time, its presentation to the Society dates to a remark made to your efficient and persistent secretary at the autumn meeting in New London, when, as an excuse for a very lame attempt to discuss an interesting paper by our former president, Dr. Braman, on Hereditv and Environment, having reference particularly to disease, I stated that if I had had more time I might say something on hereditv in its sociological relations. Thereupon Dr. Steiner exacted a rash promise that I would prepare such a paper for this meeting; so if you are bored in its rendering you must charge it up to him: if it interests you I claim the credit.

I shall make no attempt to describe the phenomena of reproduction from the standpoint of the biologist or physiologist, fascinating as that theme is and lying at the root of all hereditary phenomena; it would lead into a mass of detail

quite too elaborate for us here. Of articles accessible from that aspect, I take the liberty of referring particularly to Robert Payne Bigelow's article on Heredity in Buck's Reference Handbook of the Medical Sciences, and to Professor Adami's article in the same on Inheritance in Disease, and again by the latter in Osler's Modern Medicine, now in course of publication under the same title, but treated much more exhaustively.

At the outset I must acknowledge the great difficulty there is in disassociating heredity in crime from morbid environment, but the more I study the matter the more convinced am I that inheritance should be considered as the key to the problem. In discussing almost any phase of heredity in man, one is obliged to consider and compare it with conditions entirely under our control as contrasted with the cases herein considered in which there is apparently a very limited control. In the breeding of domestic animals of every kind we depend upon our ability to choose the parents to determine the characters, both physical and we may say mental, of the offspring, and although we cannot breed to a certainty, we can approximate sufficiently closely to know that we can preserve a certain type of animal, though the individual of surpassing merit is uncertain. It is true that while statistics show, in the breeding of thoroughbred racing horses for example, that but one out of a thousand proves to be a successful winner, the other 999 are all of the racing type—none are draft horses. We know and calculate farther that the longer the strain, i.e. the type, can be kept up the greater the proportion of successes in the breed and the more certain the type. We have, however, also learned that it does not do to keep too closely in a certain family, however marked the successes may be:—that if we breed in-and-in, as it is called, that the individuals degenerate in one way or another, the muscular development weakens, the nervous energy deteriorates and not infrequently the reproductive organs cease their function, the individual becomes sterile; the breed dies out. That in order to keep the animals good those of another, though allied, type must be introduced, and a so-called cross be made. The art of

breeding successfully consists in skillful inbreeding combined with judicious crossing. The successful breeder is the one who learns how to bring these different, though allied, forces into proper connection and develop the resultant. Neither is it sufficient simply to bring about the union of those types,—the resultant must be cared for from the earliest period of life, the embryo, the foal, the youngster must be looked after; not only must the breeding be skillful, the right spermatozoön brought into contact with the right ovum, but the succeeding conditions must be such that the fertilized ovum has the opportunity to develop; the environment both pre- and post-natal must be favorable or indeed quite the contrary may obtain. These rules hold good, of course, for all animals of whose breeding we have the control. They are familiar to everyone who has care for the propagation of domestic animals.

On the other side, there is the exceptional fact that every now and then we meet with horses (and the same holds good in their line of other domestic animals) of phenomenal racing ability, outpacing all opponents, which are without recognizable pedigrees, accidents as it were, horses brought from the plow, out of some cart, with no other than the ordinary characteristics of a good animal, which under proper training become in the language of their environment, "Kings or Queens of the Turf."

Again instances occur in which a single individual of a group, be it in a litter of multipara, or a single member of a family in the unipara, presents characteristics, physical or otherwise, entirely at variance with the type to which the other members belong. Breeders strive to produce in certain show pets, birds, dogs, etc., certain fashionable colors, and while in the main successful, every once in a while an offspring occurs that is entirely "off-color";—the mother is said to have bred back to some remote degenerate of an ancestor. It is a familiar experience with breeders of dogs, that the female with carefully selected males breeding typical puppies of high market value, accidentally steals a mongrel mate, and from that time on throws all sorts of runts and mongrels;—she is ruined for breeding

purposes. This indeed may take place in either direction, to the good or to the bad; I have just referred in the case of our friend the horse to those of exceptional merit,—the same thing happens in the opposite direction, and such an animal, with all the other characteristics of form but without the proper nervous development to produce a “stayer,” is in horseman’s parlance a “quitter”—a “duffer.” We, in more dignified language, would call him a degenerate. The explanation is of a reversion to a former inferior type; and atavism is the term used to define an intermittent heredity.

It is, of course, impossible to trace the ancestry of a mongrel: he is said to have no ancestry, though he has the same number of grandparents as the one of the longest pedigree; but, there being nothing distinctive about him, no one takes interest enough to look them up, and as there is nothing in him that it is especially desirable to perpetuate, no care is given to his progeny,—it goes for naught. In the case of the wild animal the struggle for existence determines the survival of the fittest. The male being the aggressive factor in the problem of the sexual function, the weaker are driven off and the sturdy male propagates his kind. Strength is shown not only in the contest for sexual supremacy, but in the problems of obtaining food and withstanding the vicissitudes of climate, etc.—this holding good for both sexes, the survivors have an inheritance of robustness from both, and the environment influences the development. If a pair of fattening domestic hogs, as of the Suffolk or Yorkshire breeds, with short noses and legs simply enabling them to crawl lazily to the feeding trough and back to their beds of straw, were turned out in the mountains to feed on nuts and roots or what could be gathered up, to experience the truth of the saying that it is “root hog or die,” two things would inevitably take place: they would emaciate rapidly, perhaps starve and the breed die out, or if not the progeny would rapidly change in physical characters and sooner or later present the characters of the gamey “razor-back” of the Virginia mountains, with long noses and legs, thin flanks and a capacity for speed and endurance that

should drive a well-bred horse to shame. When the environment changes the physical characters change also, up to a certain point, but beyond this they do not go.

In explanation of these and other various and apparently in some instances quite contradictory phenomena of inheritance, Darwin, in "The Variation of Animals and Plants under Domestication," propounds his "hypothesis of Pangenesis, which implies that every separate part of the whole organism reproduces itself so that ovules, spermatozoa, pollen grains . . . include and consist of a multitude of germs thrown off from each separate part or unit." It would carry me far beyond the limits of this paper to elaborate this theory. I give it to use it as authority, in explaining some of the phenomena observed in the class of cases we are considering.

In the case of the highest of the domestic animals, man, the control of breeding is by no means subjected to such close regulations; one may indeed wonder why this, the most important single function in the whole economy of nature, is apparently so loosely guarded; but it would seem that the liberty or independence of will of the individual is, in the economics of social life, regarded as of much greater importance than the benefit of the community:—that the general welfare of the community is so much better served by this independence or liberty, that it is preferable to exercise but little or no ostensible control over this function. There are instances where, for political or social reasons, the choice of the individual being restricted to certain hereditary ranks or families, inbreeding or consanguineous marriages have been frequent, and it is almost universally considered that the results are not to the advancement physically, mentally or morally of the families, so that the intermarriage of close relatives is generally frowned upon, and certain thereof forbidden by law, as incestuous, though the same relationship in the case of domestic animals is, within limits, practised to advantage, as has been stated. It must be understood, however, that the laws against incest are not for physiological but moral and social reasons, demanded by civilization. There are certain

semi-civilized or barbarous tribes where relations of this kind prevail without detriment to the physical well-being of the individual.

The principles of breeding are the same for the human animal; there is inheritance along distinct lines, usually recognizable but subject to variations apparently unaccountable but still fixed, though modified, perhaps even nullified, by environment. There are families in which definite physical characters are well marked, others in which the intellectual faculties are the prominent recognizable features, others again in which the moral forces come to the fore. Genealogical records often show this strikingly, and the history of this and other countries has numberless instances of the political power through generations of certain families. It is interesting to note in this country, where *no* birthright is a political asset to sand-lot orator or stump-speaking demagogue, who plumes himself on being a self-made man, as being nearer the ideal than the one whose father paid for his education, where the term aristocrat is one of reproach, that, notwithstanding all this, certain families have for succeeding generations held their own wherever placed; are turned to, almost instinctively, in troublous times, fathers transmitting their intellectual powers to sons until it comes to be expected that the children will, at maturity, be distinguished. There are names in the political, religious, educational and scientific history of the country that are familiar to all of us in their respective lines. The Adamses, the Winthrops, the Schuylers, the Livingstons, the Cadwaladers, the Randolphs, the Masons, the Lees, are all names that at once bring to mind matters of statesmanship and political ability of the highest order. In another group are those whose influence has been potent as leaders of religious thought; I may refer to the Edwards, the Dwights, the Bacons, the Beechers; in another are families of jurists of distinction, the Baldwins, the Shermans, the Choates, the Hoars, the Johnsons, the Tafts; in another are the educators, the Woolseys, the Kingsleys, the Hadleys, the Whitneys; in the men of science and physicians,

the Sillimans, the Warrens, the Cabots, the Bowditchs, the Nathan Smith family. I give these names simply as familiar instances to this audience; other parts of the country would give other names, and these indeed could be added to as instances of striking hereditary influences, in improving the intellectual and moral characters of the race as pertaining to the United States. I beg also to call your attention to the pregnant fact that the lines of inheritance are distinct,—the descendants of the statesmen, for instance, continue as statesmen and politicians; they do not become scientists, but they may run into the allied line of lawyers, but not ministers, neither do these latter become physicians as a rule, but rather, if they branch off, become educators. Physicians become educators in restricted lines, at professional schools, not in the classics or along philosophical lines. I shall return to this phase again later, but I avail myself of the opportunity to give in detail a most striking illustration of inherited influence for good to the community and nation as a contrast to my theme, as developed later. This is made more easy by a little work of Dr. G. A. Winship of Somerville, Mass., published in 1900, in which he traces the descendants of Jonathan Edwards, and I do this all the more readily because it cannot be otherwise than interesting to a Connecticut audience. The writings of Jonathan Edwards were characterized by Daniel Webster, himself no mean authority on this subject, and others as “the greatest achievements of the human intellect.” With no extraneous influence of wealth or recognized social position, Jonathan Edwards, by his own extraordinary intellectual ability and by transmission to his children and children’s children through generations to the present time, has impressed mental and moral characteristics upon this country and nation as positive and as definite as an Eclipse, or a Messenger, or a Hambletonian, with its carefully selected breeding, gave to its progeny. He was the product of a long line of ministers and other educated, cultivated men and women. His intellectual attainments, however, so far overshadowed their work that this feature has usually been lost sight of and he is spoken

of as if the origin of the family. He had eleven children, three sons and eight daughters;—they were brought up in almost poverty; while the father was preaching to his little frontier pastorates at Northampton and Stockbridge, writing the essays on religion, metaphysics and conduct of life that have made his name famous, and have given impress to the intellectual character of the world, his wife Sarah *née* Pierepont “was obliged to take in work to support the family.” His children (I quote) “were away from all society life and educational institutions in the home of a poor missionary family, among Indians, when Indian wars were a reality * * * * the children’s environment was not of wealth of literary or scholastic association or of cultivated or advantageous society except as to their parents,” and what with the mother working for their daily bread and the father writing his famous essays they had but little of that:—“their playmates were Indian children and youth. Everything goes to show how completely Mr. Edwards’ sons and daughters were left to develop and improve their inheritance of intellectual, moral and religious aspirations” by themselves. They were, however, offspring of a union of high promise. Sarah Pierepont “had an inheritance even more refined and vigorous than that of her husband. Her father was one of the most famous of New Haven clergymen, one of the principal founders and a trustee and lecturer of Yale College. On her mother’s side she was a granddaughter of Rev. Thomas Hooker of Hartford, “the father of the Church and one of the grand men of early American history”; the author of the first written constitution for the government of a colony and a nation. As evidence of the inheritance of intellectual purpose, in spite of the restricted income and environment, all three of the sons of Jonathan Edwards were graduated from college, and five of the daughters married graduates, and all became eminent, holding positions, one time or another, of high honor in the state and nation. Two became presidents of colleges, four were judges, two were members of the Continental Congress, one a member of the Governor’s Council in Massachusetts, one a member

of the Massachusetts war commission in the Revolution, one was a State Senator, one was president of the Connecticut House of Representatives, three were officers in the Revolutionary war, one was a member of the famous Constitutional Convention out of which the United States was born, and one was an eminent divine and pastor of the historic North Church of New Haven. "The daughters were in every way worthy of their distinguished husbands and the wives of the sons were worthy of them in intellectual force and moral qualities."

In making such a genealogical history we must include those who married into the family, whose children thus became descendants of Jonathan Edwards, so that in speaking of the Edwards family it includes the sons-in-law, but it does not the daughters-in-law, nor does it include his brothers and sisters or their descendants. Dr. Winship states that of the male descendants alone he found 285 graduates of colleges. Among them were 13 presidents of colleges and other higher institutions of learning, one Vice President of the United States, 65 professors of colleges, including the two Timothy Dwights and Theodore Dwight Woolsey of Yale, Jonathan Edwards, Jr., of Union, and Daniel C. Gilman of Johns Hopkins; Merrill G. Gates of Amherst, Edward A. Park of Andover, the president of the famous Litchfield Law School, the Columbia Law School, the Andover Theological Seminary are among them.

I cannot undertake to follow the list of educators, theologians, lawyers, on occasion soldiers, and other administrators throughout the country, West and East, who are of this descent; but Dr. Winship does not mention what I have referred to above in general, viz., the comparatively few physicians or scientists as contrasted with theologians, etc., i.e. the scientific type of mind as opposed to the metaphysical. What has been stated of this family may be said with equal justice for nearly every one of those whose names I have before given; the Edwards family was selected because of its accessibility in the first place and of its familiarity to you in

the second—and because I could verify from personal knowledge many of the facts given, and indeed add to them. Associated with New England and especially with Connecticut, the facts are also well known to many of you, and the moral I shall draw will have a certain personal appeal.

Who can estimate the economic value to the nation of such an inheritance? Prof. Irving Fisher, in a recent address, gave one billion dollars as his estimate of the cost to the nation of the ravages of tuberculosis. Will any one of you venture to calculate how much the late Daniel C. Gilman, the founder of Johns Hopkins University, was worth to the United States? He received, one time with another, good salaries in his various positions as educator;—a pauper's wage compared with some of our industrial magnates, but the price of Union Pacific or United States Steel stocks in Wall Street is a pittance, alongside of the benefits he conferred on the development of the intellectual forces of the nation. Can any one form a judgment of how valuable for the well-being (I speak of the material well-being) of the nation was his indirect influence? Yet he was but one of the collateral branches of the Edwards family. Is it to be reckoned in dollars and cents? and yet it has brought dollars and cents into an activity that I defy Professor Fisher or any other economist to put a price upon. What is thus said of one individual of a single family may be said to a less or greater extent of other members of the same family, and this family is but a type of others named and of many, many others unnamed. These are the progenitors of a nation;—whatever of individuality the American of the United States possesses is the hereditary influence of these people; and I want to emphasize it that while no ostensible plan of breeding has been followed, as is the case with our blooded stock, when we come to analyze our ancestry we find as close an analogy with what we practise voluntarily with our domestic animals as it is practicable to make;—it is essentially, strikingly, thoroughly a selection as what takes place in any rigidly selected stock farm. The difference is simply in who makes the selection in mating. In the stock farm the selection of sire and

dam is made by an outside authority, without reference to individual choice; in the human race the individual choice is paramount, and while the selection of a mate by any independent authority is in this country resented in the highest degree, our inheritance selects it for us every time. If there be any one thing to which we make claim, as an inviolable personal right, transcending every other, it is the right to choose our own life mate, but our inheritance has made the choice for us long ago; our inheritance selects the type; our inheritance selects, what we may, for want of a better word, call our taste. The environment selects the individual, but that individual must have certain personal characteristics which are attractive to us as an individual;—we may call it sympathy, perhaps, or what we please, but in that very feeling inheritance guides us. We may or may not be so guided and cared for in childhood as to prevent association with those of the contrary or degenerate class, and hence it may be claimed that this is environment which guides the selection, but that view, I respectfully protest, is incorrect. When children are associated together as intimately as they properly are in our public schools, it is almost universally found that they involuntarily, as it were, seek companionship with their own social class; and while it is not absolutely the rule, it is sufficiently so, that when a contrary companionship is made, it is remarked. As they get older, and form relations of a more intimate character, the selections are by choice even more restricted, until, when marriage is contemplated, the idea of anything else than a union with similarity of ideals and of intellectual and moral qualities becomes a matter of course. There may be those who scoff at this picture, and point to the pages of 'yellow journals and divorce courts as evidences to the contrary, but let us remember that these are the exceptions,—vastly too many in all conscience;—but as compared to sane and normal marriages the proportion is extremely small, and but emphasizes the rule that the vast majority of marriages among healthy, normally nurtured and educated individuals, is between persons of similar accountabilities, mental and

moral, and it is endeavored to be shown that these are inherited qualities.

Sir Francis Galton in his two works, in *Hereditary Genius* (1870) and the corollary to it, his *English Men of Science* (1874), with the great industry and patience and characteristic thoroughness and care of detail to be expected in the nephew of Charles Darwin, has shown the influence of heredity in the development of genius and scientific talents. The men of science were selected from the ranks of the Royal Society of England, as admission thereto is of itself proof of scientific attainments of a high order, in some practical line of study. In the more elaborate treatise on *Hereditary Genius* he is very particular in his studies in everything that could relate to their achievement of success, whatever that may have been, and he includes almost every class, from hereditary temporal peers, winning their peerages by great intellectual powers, usually as jurists, to painters, poets, musicians, naval and military commanders, even to oarsmen and wrestlers. It would take greatly too much time to attempt to give details of his labor, besides being a work of supererogation to this audience; suffice it to say, he therein gives data which must amount to proof in the mind of every logical person, that there is a definite and positive relation of the inheritance of intellectual and indeed moral qualities in all the persons whose antecedents were thus subjected to a rigorous analysis.

Turning now, however, to the study of the opposite class, to those whose lives have not been such as to commend them to favorable notice, or make us proud of our common human heritage, whose exploits are of evil, to whom we would willingly give the go-by if it was possible, whose histories are not as of honor among men, who, instead of being an uplifting force in the community, have been a drag and a burden, the weakling, the feeble-minded, the degenerate, the unfortunate, the imbecile, the idiot, the criminal, we are from the outset met with a great difficulty in tracing an inheritance. In the first place, the subjects themselves are mostly repulsive; there is nothing attractive in the study of their surroundings; their

associations are not such as one loves to dwell upon; their genealogies are not preserved among ancestral archives, family records are not kept. "No Boswell dogs the steps of the imbecile" (Bicknell). Genealogical trees with widely spreading branches and flourishing offshoots are not grown for them; whatever histories are by word of mouth with unreliable traditions as a basis and imaginations or worse, are given as facts. What records there are, are of individual inmates of poorhouses, reformatories, institutions for the feeble-minded, prisons, penitentiaries. They are born, presumably, but in many cases when or where who but the mother knows? And she may try to conceal or deny it. If recorded as a birth at an institution, a father's name may or may not be given, and, if given, who knows that it is the correct one? "It's a wise child that knows its own father"; the mother frequently does not, and even when born in wedlock, with the name of a legitimate father given, there are too many chances that it is the father only in name.

Near relatives with different family names may be inmates of widely separated penal or reformatory or pauper institutions and the relationship be undetected;—in these days of the traveling hobo, alternately tramping or stealing rides on freight cars, born in New England, found in Arizona, bringing up in police court or hospital, as the case may be, who knows anything of his ancestry or family history? The West forty years or more ago was filled with the unpedigreed. In early California days and on the frontier it wasn't safe to be inquisitive as to one's neighbor's name in the "States." How many of the convicts in our prisons are there under fictitious names I cannot say; Mr. Garvin thinks that under the Bertillon system of measurements and recording there are but few, that fictitious names and histories are rare; it is possible that this is so; I certainly cannot put my opinion against his, but until a much more elaborate, a fuller *family* history of each prisoner is obtained *and recorded*, and a wider system of comparing prison and such like records, the relative importance of inheritance

and environment in convicts must be undetermined. Under the Bertillon system the physical characteristics of individual prisoners are mapped out and detected for police purposes, but it does not give mental or moral peculiarities, and these are the more important in our problem. Indeed the formula has so many unknown factors, the x quantity is so very large, that its solution is exceedingly difficult.

There have been but a very few instances where the subject of inherited crime has been given more than an exceedingly superficial attention—genealogies of criminals are rare and the pedigrees usually lost in a couple of generations. Investigators in the lines of pauperism, degeneracy and crime, however, are quite of one mind as to the interdependence of these conditions. A most striking illustration of the mutual relations of these conditions was shown in a little book of some 120 duodecimo pages, which has been accepted as a classic, called “The Jukes,” this being the fictitious name given by the author, Mr. Richard L. Dugdale, to the various branches, some forty-four in number, of a family which he met with while making an investigation looking to prison reform in New York State in 1873. The book itself is in its fourth edition, the last published in 1888 with an introduction by Mr. William F. Rounds, Secretary of the Prison Association of New York and also of the National Prison Association of the United States. The account of this family is most interesting; to the student of criminology, fascinating. One cannot study its contents without being convinced, that inheritance of bad morals is as much a factor in the make-up of society as we have learned of the good. This work gives the genealogy of a family descending from one man who first appears in the mountains of Ulster County, New York, born sometime between the years 1720 and 1740. Mr. Dugdale calls him “Max”; he thinks “Max” was descended from the early Dutch settlers. He is described as a hunter and fisher, a hard drinker, jolly and companionable, averse to steady toil, working hard by spurts and idling when not compelled to work; he had a numerous progeny, some of them almost surely illegitimate. Two of his sons married two

out of six sisters (and here Mr. Dugdale begins his account of "The Jukes"), who were born between the years 1740 and 1770. Their parentage could not be absolutely ascertained, but the probabilities are that they were not full sisters and some, it may be all, were illegitimate. The family name in two cases was obscure, which accords with the supposition that at least two of the women were half sisters to the other four, the legitimate daughters bearing the family name, the illegitimate keeping either the mother's name or adopting that of some of the half-dozen, more or less, unascertained fathers. Four of these women in the first generation were married; the sixth moved out of the county and could not be traced; of the five that were known, three had illegitimate children before marriage. One, Mr. Dugdale calls "Ada" Jukes in his genealogy, but she is known throughout the literature of criminology of New York and otherwheres as "Margaret, the Mother of Criminals." She had one bastard son, and he is the progenitor of the distinctively criminal line. Another sister had two illegitimate sons, who appear to have had no children. A third sister had four, three boys and one girl; the oldest three children were mulattoes and the youngest, a boy, white. The fourth sister is reputed chaste; of the fifth no information with regard to her chastity could be learned, but she was the mother of one of the distinctively pauperized lines and married one of the sons of Max. The progeny of these five sisters has been traced with considerable exactness through five generations, making the total heredity enrolled stretch through seven generations if we count Max as the first. The number of descendants registered includes 540 individuals who are related by blood to the Jukes and 169 by marriage or by cohabitation, in all 709 of all ages, alive and dead, and the aggregate of this lineage reached, at the time the book was published, 1877, to something like 1,200 persons. Mr. Dugdale follows, so far as possible, the lives of these people in order to form an approximation of the length of time they had been, in one way or another, burdens on the communities in which they lived, as paupers, imbeciles,

or criminals, and from that to calculate the economic damage that a lineage of this kind is to the community. Summarizing his results only, he concludes that the actual cost to the community for the seventy-five years of the life of this family reaches the astounding sum of \$1,308,000. These calculations have been revised by criminologists, sociologists, and others interested in the economic side of the question, and are approved as reasonable. They are referred to and accepted whenever the economic damage of vice and pauperism is considered in this country. So much for the "Jukes."

There are many accounts of families where all, or most of the members, through perhaps two generations, have shown criminal and pauper characteristics, but it is not justifiable to claim inheritance as against environment on so short a pedigree. Another recorded case of a line sufficiently long to entitle it to the distinction of the "Jukes" is one recorded by the late Rev. Dr. O. C. McCulloch of Indianapolis, Indiana, in which, singularly enough to the Biblical student, the actual family name is "Ishmael," starting from one Ben Ishmael in Kentucky in 1790, ending in Indiana in 1888, from whence the report is given. Ben Ishmael had eight children, five sons and three daughters; one son, John, married a half-breed Indian woman; he had seven children; three of his sons married three sisters of a pauper family; these had fourteen living children, of whom thirteen raised families having sixty children, thirty of whom were living in the fifth generation, at the time the paper was written; what the increase is since then, twenty years ago, is not reported, but the family record is that of poorhouses, houses of refuge, women's reformatories, prisons and penitentiaries, and continuous town aid. They are intermarried with other members of the group and with two hundred and fifty other families; the family histories are of murders, prostitutes, illegitimates; they live by petty stealing, begging, etc.; in summer they "gypsy" about, wandering off into the neighboring states of Ohio and Illinois, returning in the fall. "Strangely enough, they are not intemperate."

Dr. McCulloch gives another Indiana family, Owens by name, of four children, two of whom, William and Brook, have been traced. William's two sons had been in the penitentiary, a daughter was a prostitute with an illegitimate child, two sons of the third generation had penitentiary records. There have been several murders and a continuous pauper and criminal record;—there is much prostitution, but little intemperance. The other son, Brook, had a son John who was a Presbyterian minister. He (I cannot with surety make out whether Brook or John is meant, but I think John) raised a family of fourteen illegitimate children. Ten of these came to Indiana and their pauper record begins about 1850. Of the ten, three raised illegitimate families in the fourth generation, and of these two daughters and a son in the fifth generation.

Dr. McCulloch emphasizes three things: first, the wandering habit, which he ascribes to the half-breed mother; second, the licentiousness which characterizes both men and women, with its accompaniments of diseases, general incapacity, and unfitness for work; and third, that which I also wish to emphasize, the way in which, in our modern civilization, these conditions are improved upon and aggravated by our systems of charitable aid, encouraging them in this idle, nomadic life and in the propagation of children of similar characteristics *ad libitum*.

The absence of intemperance in these two families is to be noted, showing that the pauperism and degeneracy was not the result of artificial deterioration produced by alcoholism, but an inherited moral degeneracy bred in the blood (so-called), but really being the nervous system. This is an extremely important fact in considering the question of inheritance. It is true that owing to environment drunkenness is frequently, perhaps usually, an accompaniment of crime, but here are two well authenticated instances where crime was rampant through generations, yet drunkenness was so infrequent as to be remarked.

Dr. McCulloch summarizes the histories of these families in an awful picture, which he states could be repeated almost *ad infinitum* if one cared to follow up the history of other families. I take the liberty to quote briefly. "Of the first generation only three are certainly known, but in the second there are histories of eighty-four; in the third there are histories of two hundred and seventy-five; in the fourth there are histories of six hundred and twenty-two; in the fifth, six hundred and fifty-one—the sixth, for the ten years of from 1880 to 1890, but fifty-seven—a total of 1,692 individuals. In the family histories there are a number of murders, there are recorded one hundred and twenty prostitutes; the records of the City Hospital of Indianapolis show, omitting surgical cases, acute general diseases and cases from outside of the city, that seventy-five per cent. of the cases treated were of this class; the number of illegitimates is very great, and the Board of Health reports that an estimate of still-born children found in sinks, privies, etc., would be not less than six a week" (I doubt this last statement). He gives more details, but I won't repeat them—they are facts, he states, and can be verified—and they were from but thirty families out of a possible two hundred and fifty; the individuals traced were over five thousand, interwoven by descent and marriage, with illegitimate cohabitation thrown in;—they underrun society like devil grass. Pick up one and the whole five thousand would be drawn out.

Two factors are mainly responsible for this; one belongs to the families affected, i.e. their heredity;—the other incident to our social organization, i.e. public relief. A premium is paid for idleness and wandering; the amounts paid in the town in which these people thrive varies yearly from seven thousand dollars to twenty-two thousand dollars, in one year going up to ninety thousand dollars. Of this amount, Dr. McCulloch states fully three-fourths have gone to this class. To public relief, then, is largely due the perpetuation of this stock.

In sociological science one must regard crime as essentially a disease, to be cured or eradicated or prevented as circum-

stances present themselves, and the old proverb as to the ounce of prevention and the pound of cure holds good, as in the treatment of other diseases. Granting this, and there are but few who would care to dispute this proposition in social economics, one may study its etiology, its course, its variations, its terminations, and, as physicians, its remedy. I shall confine myself here to the first and last. The causation is from two principal sources—inheritance and environment: there are very decided differences of opinion among criminologists, sociologists and others interested as to which plays the most important rôle. My studies are of but recent date, and my opportunities for personal investigation almost null; but I confess to have found the subject vastly more interesting than I had any idea of when my attention was first directed to it. I find these differences of opinion to be dependent largely, as might be anticipated, upon the point of view; wardens of prisons, superintendents of reformatories and penal institutions generally, having to do with the individual, and more frequently the adult, criminal or delinquent, thrown upon them from outside, as it were, getting only his personal history to guide them, are I find, apt to regard environment as the most important or indeed the sole factor; whilst those whose contact is through the family life, with the very young, the feeble-minded, the imbecile, in poorhouses, in charitable institutions for the care of the feeble-minded, etc., who have to study from the inside the means of support, modes of living and ancestry—to find out the caretaker (heaven save the mark) of the family, to determine which of several political communities, towns or cities is financially responsible for their support, are a great deal more convinced that the pauper or criminal tendency is born with them. That they are the victims of an inheritance of vice; of an indisposition or inability to resist temptation; of an actual desire to do the wrong thing; of a more or less irresistible impulse to injure or inflict pain upon something; that this frequently shows itself in very early life, without any sort of provocation, are facts well established in criminology.

In a very suggestive paper by Dr. J. Bruce Thomson, published in the *British Journal of Mental Science* in 1869, on the Hereditary Nature of Crime (eight years before "The Jukes" was written), he takes very strong ground in its favor, and defines what he designates as a "criminal class" as of a racial type, "distinct (I quote) from the other civilized and criminal men. It is marked by peculiar physical and mental characteristics that distinguish it from the occasional criminal from environment." He enlarges upon the hereditary nature as compared with environment with great particularity and force, and as evidence of the wide distribution of the abnormal state, he quotes from the posthumous papers of a medical friend from another institution, who says "I have never seen such an accumulation of morbid appearances as I witness in the post-mortem examinations of the prisoners who die here. Scarcely one of them can be said to die of one disease, for almost every organ of the body is more or less diseased, and the wonder to me is, that life could have been supported in such a diseased frame. Their moral nature seems equally diseased with their physical frames, and whilst their mode of life in prison reanimates their physical health, I doubt whether their minds are equally benefited, if improved at all. On a close acquaintance with criminals of eighteen years standing, I consider that nine in ten are of inferior intellect, but all are excessively cunning." Dr. Thomson adds his testimony to that of his colleague by saying, "out of a (prison) population of 5,432, no less than 673 were placed on my registers as requiring care and treatment on account of their mental condition, as follows: 580 weak-minded or imbecile (36 with suicidal tendencies added) and 57 epileptic, hence twelve per cent. mentally weak and these exclusive of those who had become recognizably insane and transferred to the lunatic department for criminals." He emphasizes the fact that in the feeble-minded referred to, that the greater number were seen to be so on admission or in a few weeks thereafter, apparently from congenital causes, and states that similar observations as to the low mental calibre of criminals are well

known in the Irish and English prisons also, but have been attributed (as he thinks mistakenly) to the effects of imprisonment, rather than by deterioration from hereditary influences. He compares the hereditary taint and tendency to crime to the resemblance in the transmission of other hereditary maladies, and speaks of the singular transmutation from physical to psychical diseases, and to diversities of these diseases interchanging often with crime. These diversities and irregularities, the multiplicity of form in which the criminal taint breaks out in different families and remote connections, may be compared to the protean forms in which the strongest hereditary disease we know, i.e. syphilis, shows itself. It took years and generations of study and investigation before we felt sure that we had established a hereditary form of syphilis, but we are now as sure of it as of almost anything we know in medicine.

When we consider the extremely complicated or remote route through which the phenomena of color-blindness are transmitted, i.e. through the female line, but affecting only males;—that the nephews *through the sisters* of a color-blind man are affected, but not his own sons;—that the hereditary nature is so absolute that one can almost predict the individuals in which the disease will show itself,—we certainly have no reason from analogy to wonder or doubt the hereditary transmission of crime, equally a disease of the nervous system, but affecting another set of nerve cells. We simply cannot identify the cells involved in crime, so surely as we can those of the retina in color-blindness. The hypothesis which Darwin gives to explain these reversions in the theory of pangenesis, with its accompanying assumption of gemmules capable of transmission in a dormant state to future generations to be then developed, is capable of application to these cases of low morals, just as much as we accept without much question the transmission of high moral characters or recognizable physical characteristics. Dr. Thomas regards the incurability of crime, as manifested in his observations, as an evidence of its hereditary nature in this typical racial criminal class.

As previously remarked, the records of families with high standards are kept with scrupulous care, while the criminal and degenerate pauper is buried in Potter's field with no monument or emblazoned record to memorize his career. The only one to take cognizance of his life or death is the court officer, who records his conviction and sentence, and the morgue keeper, who catalogues in some out-of-the-way register the fact and perhaps place of his burial;—unwept, unhonored and unsung. When some one, as Mr. Dugdale and Dr. McCulloch, wishes to study from scientific or philanthropic purposes the family history, it is only with great pains and infinite patience and with many loopholes that it can be made out, and even with the utmost care there must be many gaps in the record.

Institutions for the feeble-minded and those affected with diseases which are in large, if not the main, part the immediate results of degeneracy, in one shape or another, are increasing rapidly. It is also asserted that the criminal as defined by Dr. Thomas is increasing in undue ratio;—certainly there is a greater number of insane, with which they are closely allied, and there is a greater number of reformatory and penal institutions.

Several years ago, in the early days of antiseptic surgery, while showing my honored friend and fellow-student, Dr. Henry P. Walcott, the president for many years of the Massachusetts State Board of Health, and now also president of the Massachusetts General Hospital, over the New Haven Hospital, with its then recent equipment for the new order of things, he asked me from what class in life the patients came, what proportion paid anything for their care, treatment, etc. Receiving the inevitable reply that they were from quite the poorer classes, many actual paupers, others degenerates of one class or another, he asked with great earnestness, "Carmalt, do you appreciate that you are giving to the pauper and the degenerate an assistance in the struggle for existence more than the average self-supporting and self-respecting laborer and mechanic, whose nature revolts at the idea of receiving a

charity, can obtain?" Of course my reply was an acquiescence, but it included the counter inquiry, would you let them go uncared for? How can we do otherwise? Would it not be inhuman? The conversation went on to the usual termination;—that we were doing our simple duty to humanity, etc., could do no less, any more than we could shorten the life of an incurable. The theme is not new to any one of us; it is before us always; and to every physician comes the unavoidable query, must this thing be continuous? Are we doing the right thing to counteract natural laws, which, without our interference, would lead to the extinction of the degenerate and the unfit? What is there to do for it? Is there no remedy?

Such problems are constantly coming before the thoughtful physician, but I think there is a change coming into the minds of the philanthropic laity. I judge it from a change in the character of the papers which appear in the Proceedings of the Conference of Charities and Corrections, which may be taken as an index of the thought of a very large number interested in the betterment of humanity. Clergymen, teachers, physicians, superintendents of insane asylums, alienists in general, the better class of wardens and chaplains of prisons, penitentiaries and reformatories, economists, jurists, professing and unprofessing philanthropists, settlement workers and those interested in social problems generally compose its membership; reformatory subjects of whatsoever kind are considered. It has been in existence now thirty-five years, meeting annually all over the country. Most of the information contained in this paper has been derived from the papers and discussions in its meetings, and I find quite a change in the tone of the discussions as to the treatment of crime. Thirty and more years ago the discussions turned on the individual, whether degenerate, imbecile or criminal; how to improve, reform or best care for him. The proper environment; the instruction best adapted to his intellectual capabilities; how to stimulate and develop his meagre mental outfit; how to protect him from unfavorable outside influences, etc. As the necessity for these provisions for his benefit became

appreciated and the means thereto adopted, it became evident also that the various classes thus benefited were increasing in numbers and that a new factor was added to the problem in the increasing number of children to be cared for, likewise. That these children inherited the traits of the parents; they were inefficient in taking care of themselves; they lapsed into habits of idleness and perpetrated apparently meaningless criminal acts of greater or less degree; they again had to be taken care of; they were diseased in one way or another, more frequently in some more or less acute affection of the nervous system; they were imbecile, or epileptic, or vicious, or lazy, without capacity or ambition.

It has become borne in upon the investigators, that in their charitable desire to help the individual, they are placing an increasing burden on the community. The injustice and evils of this state of things is forced upon them in various ways, taxes are increased, and sadder yet, the persons helped become in many ways menaces to others; thieving, beggary, drunkenness, assaults, harlotry, instead of being diminished, as was hoped and expected, have become worse, and it is imperative that while the individual must in Christian charity be cared for, the community at large must be protected; that a broader charity, looking to care for the race rather than the individual, must be practised.

As the propagation of this degenerate or criminal class of children is the evil burden, attempts towards a partial stoppage of the supply are made by forbidding the marriage of the women who were afflicted with diseases of the nervous system liable to be transmitted to their children, as epilepsy, insanity and imbecility. The best of these is that in this state; passed mainly through the intelligent efforts of our honored fellow-members, the Drs. Knight, father and son. But while preventing marriage, on the face of it, is the legitimate means, it by no means fulfills the whole purpose; the worse condition of the bearing of illegitimate children can and does still go on, and these children and the community are still worse off, inasmuch as their environment is even worse than the worst

of those born in wedlock. To offset this the proposition is made for compulsory segregation during the child-bearing period of women, who, having no natural protectors, cannot or do not, by reason of mental infirmity, of one kind or another, care for themselves, but are liable to become public charges, or to fall into harlotry, or both. These are partial schemes for the restriction of the breeding of degenerates by law, and so far as I know there has been no protest against either; but I submit they do not go far enough, inasmuch as they apply to only one sex, to only one factor in the problem of inhibiting the propagation of these undesirable citizens.

In the compulsory segregation of feeble-minded women during the child-bearing period only half of the problem is met. The other factor in the reproductive process is still at large, capable (and more than willing) of overcoming whatever legal restraints may be enacted, towards restricting his indulgence of the sexual instinct. In any scheme, therefore, looking to the improvement of the race both factors must be considered. Applying the same principles that we do in the breeding of domestic animals to secure improvement in the breeds, viz., selecting only the best to serve the purposes of reproduction, and sterilizing the unfit, it was shown in the early part of this paper that, within certain limitations, natural selection, as influenced by environment, in certain indicated families has and does largely fulfill the first of the requirements mentioned.

Of course there is no intention of claiming that, in the selection of our marriage mates, we choose with much reference to the children that may result, or that this is more than one item in the long category of qualities we consider, when the question of a lifelong companionship is contemplated, but as a matter of fact the result is the same. The deformed, the insane, those afflicted with other serious nervous disorders, syphilitics, epileptics or feeble-minded are so repugnant to the sensibilities of the right-minded that they are passed by. It is true that some abnormally sentimental women think they are doing a praiseworthy act, in trying to reclaim or care for

a drunken degenerate by marrying him; these are, however, exceptions (and the result usually proves its falsity), so that the normal selects another normal for a mate, and the defective or degenerate is either left to itself, or, worse yet, selects another of the same class to perpetuate the kind, in violation of the rule among both domestic and wild animals. The difference between the human and the animal selection lies in this, that while in the latter case the selection is made by the breeder for the direct purpose of improving the physical stock, in the former the selection is brought about by a greater or less, and usually greater, desire for intellectual and moral companionship of the most intimate and lasting character.

The question, therefore, presents itself, whether or no we have the right, for economical reasons of state, to so regulate the process of reproduction in man as to control or inhibit the unfit. The control seems to be granted when we forbid the marriage of children and punish carnal intercourse with them.

I have already spoken of the excellent laws in this state forbidding and penalizing the marriage of certain defined abnormal mental organizations; may we not extend these? The reason for their enactment is in the recognition of the laws of heredity already mentioned,—is there not as much justification in legislating for the male as for the female? Would we be obliged to provide shelter and support in segregating these women if the males were sterilized? Confessedly, the compulsory segregation is not sufficient. Crime, pauperism and degeneracy are not becoming less; the restrictive means already employed do not succeed in checking them. The steady increase in number and size of prisons, almshouses, insane asylums and reformatories, out of proportion to the increase in population, is proof to this effect. As civilization spreads, improvement in the race should increase *pari passu*, but partly, at least, for the reasons already stated of giving the degenerate a better chance than the normal, the former increases unduly; and while the life of civilized man has during the last century increased an average of ten years, in numbers the degenerate more than holds his own.

In the course of practice we are occasionally called upon to sacrifice the life of the child for the sake of the life of the mother, and no law protests. We regret the necessity, but claim absolute justification, and this is an infinitely (I use the word in its fullest signification) greater responsibility that is proposed here, viz.: to sterilize the unfit. The only question is where to draw the line;—what classes are to be included in the procedure? Who are the unfit? On this particular point we may well consult with the jurist, but he can learn from the physician and the biologist what particular forms of abnormality are so likely to be perpetuated in the offspring as to make its continuance a peril or a detriment to the community. The jurist, by reason of his association with crime, naturally thinks of the law-breaker, the criminal, the one he is called upon to punish whether in retaliation or as a deterrent. He can estimate between different classes of crime perhaps better than the physician, and could thus help us to enumerate what especial classes of criminals should be subjected to the procedure; perhaps also help to decide which of two different operations would be the best, though that is fairly a surgical question.

Dividing crimes as between those of violence against the person, murder, rape, assault with intent to kill or commit rape, etc., and those affecting property, the former would in this connection, at least, be regarded as the most heinous; those against property, thieving, forgery, embezzlement, unless accompanied with violence, are not regarded as indicating so grave a moral abnormality;—though their effects may be even more far-reaching, and be more incorrigible, still the former is punished the more severely. It is not the place here to discuss this phase, but to the non-judicial mind, some of the deep-laid plans of forgery and embezzlement indicate a lower moral standard than those attended with violence, and the hereditary taint is often pronounced.

In the papers of the Conference of Charities and Corrections, before referred to, there is a notable paper by Dr. I. N. Kerlin of the Institution for Feeble-minded at Elwyn, Pa.,

that every one interested in this subject should read. As the result of his study of more than twenty-five years of this class, he is absolutely satisfied that of his institution, a typical one, five per cent. are "moral imbeciles for whom little (in the way of training) can be done. Congenital and hereditary evil propensities are so powerful that all human agencies are too feeble to cope with and arrest them. * * * * They are the children of degenerate parents, the consequences of whose sins they are now bearing * * * * These are the children that in spite of all our efforts to rescue them will finally go to swell the class of prostitutes, paupers and habitual criminals. Love, kindness, rewards, encouragements, warnings, entreaties, punishments, are all equally inefficient except as to temporary restraints * * * * What shall be done for them it is hard to say." In a paper by Dr. J. D. Scouller, speaking of juvenile delinquents, he says, "their souls are as impressionable to gratitude as the granite slab to the rays of the sun." And that fifty per cent. come from degenerate parents. Dr. S. P. Savage says of prisoners in the state prisons, we must recognize as certain, "hereditary influences" in a class he designates as "moral idiots," they are placed in idiot asylums, but they tend "to disregard all social and civil law": other prisoners "are criminals by hereditary tendencies," and he confesses to an inability to differentiate in these cases between insanity and criminality.

In 1899 the honored Chief Justice of this Commonwealth, in the June number of the *Yale Law Journal*, advocated, in eloquent and strenuous terms, the enactment of laws providing for castration as a punishment for sexual crime associated with violence, viz., rape. The writer, while in full sympathy with the idea of the paper, considers that in the first place it does not go far enough; it applies to but a limited number of those whom it *should* reach, and in the second it is conceived in the spirit of the jurist, condemning a crime, rather than that of the philanthropist or of the physician, seeking a remedy for a disease. With the greatest respect for the eminent jurist referred to, your speaker feels that while such

a law as he advocates would of itself be a deterrent to a certain number of criminals, it voices too much the feeling of a judge endeavoring to right a wrong inflicted on an innocent victim; it is simply on the lines of other laws, already in our statutes, which, having proved ineffectual, it is hoped this will prove more so. It cannot do more than affect a limited number, and while I acknowledge it would be a long step forward, making the punishment fit the crime, it does not tend in the direction of removing the incentive to crime. When an assault of this kind has been perpetrated it doesn't remedy the injury to the victim to have the perpetrator punished. It doesn't bring the dead back to life to have the murderer hanged. It doesn't relieve the women, subjected to a rape, of the sense of degradation, worse than death, to have the brute castrated. The only good it does is in the satisfaction it gives the community that vengeance in appropriate form has overtaken the criminal, and that he will be unable to repeat the offense; it is *lex talionis*, the law of retaliation. In so far as the community protected, but an injury has been inflicted that under an effectual system of jurisprudence should have been prevented. That would not occur if society, as represented in our legislatures, would make and have executed laws looking towards the betterment of the race, instead of, in its mistaken philanthropy, giving the unfit advantages in the struggle for existence.

Where the aberration is towards sexual violence, they can be rendered innocuous by the simple surgical procedure of castration, and, at the same time, made useful as the patient ox or gelding instead of being both a burden and a menace to the community. With the honored Chief Justice, I believe that, in this class of criminals, such a law would be more of a deterrent than any other punishment;—more potent than anything else for several reasons;—first, because of the attendant shame where known; second, because there would be less interference by abnormal sentimentalists of both sexes in carrying out this law than in death for murder. It would also do away to a very large extent with the horrible lynchings per-

petrated in certain parts of the country. There are, however, stronger reasons than the law of retaliation in its favor: in the first place it inhibits to a very marked extent the abnormal sexual impulse even if it does not entirely abolish it, and so far protects the woman from being threatened with assault; secondly, *it stops the breed*,—society is not, in another generation, exposed to like disaster and the effect on crime in general is far reaching, in that other crimes, less heinous, may be restricted. In how far this would be effectual, I cannot from any opportunity I have had to observe, in the human race, form an opinion; nor do I know what pertains in countries where the practice prevails for other reasons; in harems, or to preserve the high voices of singers; but reasoning from analogy as observed in the domestic animals it certainly renders such animals less vicious; we know that the ox or gelding or other castrated animal has nothing of the viciousness, liable to show itself in sudden and violent attacks of ungovernable rage, that exists in bulls and stallions.

Neither can I see in this a violation of the constitutional provision against inhuman and cruel punishment. On this point I quote from the article already referred to from the pen of the Chief Justice, p. 380: "In the first half of the eighteenth century a man convicted in the Superior Court of mayhem, was sentenced to this form of mutilation because it was doing to him precisely what he had done to another. At that time there was no punishment prescribed by law for such a crime. There was a statute, which had been in force since 1672, 'that no Bodily Punishment shall be inflicted that is Inhumane, Barbrous or Cruel.' The court stayed judgment until the will of the General Assembly could be known. That body thereupon resolved 'that the Judges cause such punishment to be inflicted as to justice appertains, according to their best judgment.' The Superior Court was then composed of Roger Wolcott as Chief Justice, who was afterwards Governor of the Colony, James Wadsworth, Joseph Whiting, William Pitkin, afterwards Chief Justice, and Ebenezer Silliman. It has seldom in its history been better

manned. *They* did not think it inhuman or cruel to adopt the *lex talionis*, and passed sentence of *membrum pro membro*." Does any member of this audience want better authority than the above with that of Chief Justice Simeon E. Baldwin added to it? If he does perhaps he will allow me to quote from the greatest exponent of the laws of love and charity we know, who was in the world but not of it, saying, "If thine eye offend thee, pluck it out and cast it from thee."

As for cruelty in the infliction of pain, both local and general anesthesia are at our disposal.

So far for the criminal who is confirmed in his sexual vices; for the criminal who is habitual to acts of violence; the person in good physical condition who has no moral sense, "is a moral idiot" or "moral imbecile"; by depriving him of the impulse to do harm make him perhaps a useful beast of burden. That you may prevent these criminal acts by locking him up, is true, but does he stay locked up? No;—and when free again, so far from imprisonment acting as a deterrent, it on the contrary by the long period of forced abstinence determines in him further excesses. Better far by a simple surgical operation remove from him the desire to do harm, and put him in the class of the innocuous forever.

As to how far there is justification for a similar procedure upon those who do not require restraint for violence to others, but are able and do propagate their kind, to entail a constant drain upon the State for their support, may, on humanitarian grounds be disputed, but as a matter of State economics there can be but an affirmative answer. The right of the State to prevent marriage or to compel segregation, in them, is not denied; is the sterilization of idiots and imbeciles as much of a restraint? And is not their freedom afterwards a compensation? At any rate the care of the State ceases with them;—subsequent generations do not have to be supported.

To this society of men and women devoting their lives to the care of individual sufferers from disease, and in so far to the protection and improvement of the family, I bring the broader question of the improvement of the race, to which we

are equally bounden by our Hippocratic oath and as a matter of public advantage. Improvement in the race is what we are, every one of us, engaged in;—it is the sole reason for the existence of our profession, and the modern cult of eugenics is doing, under a high-sounding and specialized name, just what the medical profession has been doing, from the time the healing art was known. Committees of this and other medical societies have often considered and advised the forbidding of and penalizing the marriage of syphilitics, to prevent the propagation of that disease to future generations. Is there not, may I ask, an equally good or even better ground for preventing the propagation of persons with grave nervous disorders, provided we can establish the fact of the hereditary character of those conditions? I think this has been done.

Not all the children of syphilitics are necessarily affected with the disease, neither are all the children of imbeciles imbecile, but I unhesitatingly assert that the proportion of the children of the feeble-minded who are imbecile is greater than the proportions of children of syphilitic being syphilitic. We know that syphilis in time wears itself out; that the first pregnancies are more liable to show the disease than the later,—but such is not the case with the feeble-minded; the later offspring of the union of this class of degenerates are just as liable to be imbecile or feeble-minded as the earlier.

The particular method of effecting the sterilization, whether castration or vasectomy, may justly be left for more technical consideration at some other time. It is probable that different methods may be applicable to different individuals;—to the rapist or one whose crime is attended with violence, it may be considered well to make a different operation from the feeble-minded or imbecile—my object is simply to argue in favor of the principle of inhibiting the procreation of criminals and their progenitors, in the most effectual way.

WORKS CONSULTED IN THE PREPARATION OF THIS ARTICLE.

- Elam, Charles. "A Physician's Problems," article on Natural Heritage. Macmillan & Co., 1869.
- Thomson, J. Bruce. "Heredity Nature of Crime," *British Journal of Mental Science*, 1869.
- Galton, Francis. "Hereditary Genius." D. Appleton & Co., 1870.
- Galton, Francis. "English Men of Science." D. Appleton & Co., 1875.
- Dugdale, Richard L. "The Jukes." G. P. Putnam's Sons, 4th ed., 1888.
- Darwin, Charles. "The Variation of Animals and Plants under Domestication." D. Appleton & Co., 1896.
- Ferro, Enrico. "Criminal Sociology." D. Appleton & Co., 1897.
- Christison, J. Sanderson. "Crime and Criminals." The W. T. Kcener Co., Chicago, 1897.
- Morrison, W. Douglas. "Juvenile Offenders." D. Appleton & Co., 1897.
- Lombroso, Cesare. "Criminal Anthropology," in *Twentieth Century Practice*, vol. xii. Wm. Wood & Co., 1897.
- Drähms, August. "The Criminal," Introduction by C. Lombroso. The Macmillan Company, 1900.
- Ellis, Havelock. "The Criminal." Charles Scribner's Sons, 1900.
- Winship, A. E. "Jukes-Edwards: A Study in Education and Heredity." R. L. Myers & Co., Harrisburg, 1900.
- McKim, W. Duncan. "Heredity and Human Progress." G. P. Putnam's Sons, 1900.
- Hall, Arthur Cleveland. "Crime in its Relations to Social Progress," *Columbia University Studies in Political Science*, 1901.
- Parmelee, Maurice. "Anthropology and Sociology in their Relations to Criminal Procedure." The Macmillan Company, 1908.
- Galton, Francis. "Memoirs of My Life." E. P. Dutton & Co., 1909.
- Bateson, Wm. "Mendel's Principles of Heredity." University Press, Cambridge, 1909.

The association known at present as the Conference of Charities and Corrections held its first meeting in New York in 1874, as the Conference of Charities. The proceedings of that and the next one, held in Detroit in 1875, appeared in the *Journal of Social Science*. Since it has published its proceedings in a separate volume. The following articles have been consulted and perhaps quoted without further acknowledgment:

- Dugdale, R. L. "Hereditary Pauperism." 1877, p. 81.
- Allen, Nathan. "Prevention of Crime and Pauperism." 1878, p. 111.
- Lovell, Mrs. C. R. "One Means of Preventing Pauperism." 1879, p. 189.

- Milligan, J. L. "Control of Vicious and Criminally Inclined Females." 1882, p. 176.
- Hall, A. E. "Reformation of Criminal Girls." 1883, p. 188.
- Cobb, M. E. "Preventive Work Among Children." 1883, p. 480.
- Bryce, P. "Moral and Criminal Responsibility." 1888, p. 75.
- Slocum, W. F., Jr. "Drunkard's Families." 1888, p. 131.
- McCulloch, O. C. "The Tribe of Ishmael: A Study in Social Degeneration." 1888, p. 154.
- Kerlin, I. N. "The Moral Imbecile." 1890, p. 244.
- Wright, J. F. "Marriage Relationships in the Tribe of Ishmael." 1890, p. 435.
- Wright, A. O. "The Defective Classes." 1891, p. 222.
- Knight, G. H. "The Feeble-Minded." 1895, p. 150.
- Gould, E. R. L. "The Statistical Study of Hereditary Criminality." 1895, p. 134.
- Wright, A. O. "The New Philanthropy." 1896, p. 5.
- Bicknell, E. "Feeble-Mindedness as an Inheritance." 1896, p. 219.
- Cooley, Chas. H. "Nature vs. Nurture in the Making of Social Careers." 1896, p. 399.
- Savage, E. P. Discussion on above. 1896, p. 458.
- Garson, J. C. "Prevention of Feeble-Mindedness from Moral and Legal Standpoint." 1898, p. 294.
- Knight, Geo. H. "Prevention from Legal and Moral Standpoint." 1898, p. 304.
- Henderson, C. R. "The Relation of Philanthropy to Social Order and Progress." 1899, p. 1.
- Powell, F. M. "Growth and Arrested Development." 1899, p. 259.
- Knight and Bicknell. Discussion on above. 1899, p. 406.
- Rogers, A. C. "Recent Attempts at Restrictive Marriage Legislation." 1901, p. 200.
- Wilmarsh, A. W. "Feeble-Minded and Epileptic." 1902, p. 152.
- Barr, M. W. "The Imbecile and Epileptic vs. Tax-Payer and Community." 1902, p. 161.
- Johnson, A. "The Segregation of Defectives." 1903, p. 245.
- Perry, M. A. Do., Min. Report. 1903, p. 253.
- Kecne, G. F. "The Genesis of the Defective." 1904, p. 391.
- Butler and Brinkerhoff. Discussion on above. 1904, p. 546.
- Wines, F. H. "Treatment of the Criminal." 1904, p. 422.
- Butler and Hutchinson. Discussion on "Defectives." 1905, p. 525.
- Butler, A. W. "A Notable Factor of Social Degeneracy." Proceedings American Association for the Advancement of Science, 1901.
- Butler, A. W. "The Burden of Feeble-Mindedness." Presidential Address, National Conference of Charities and Corrections, 1907.

ADDENDA.

Laws at present enacted in the United States inhibiting the procreation of the unfit.

Connecticut Revision, 1902.

Section 1354. MARRIAGE OF EPILEPTICS AND IMBECILES. Every man and woman, either of whom is epileptic, imbecile or feeble-minded, who shall intermarry, or live together as husband and wife, when the woman is under forty-five years of age, shall be imprisoned not more than three years. But nothing herein contained shall be construed as affecting the mutual relations of any man and woman lawfully married on or before the thirty-first of July 1895.

Section 1355. PROCURING OR AIDING SUCH MARRIAGE. Every person who shall advise, aid, abet, cause, or assist in procuring the marriage of the persons described in Section 1354, knowing them or either of them to be epileptic, imbecile, or feeble-minded, shall be fined not more than one thousand dollars, or imprisoned not more than five years, or both.

Section 1356. PENALTY FOR CARNAL KNOWLEDGE IN CERTAIN CASES. Every man who shall carnally know any female under the age of forty-five years who is epileptic, imbecile, feeble-minded, or a pauper, shall be imprisoned not more than three years. Every man who is epileptic who shall carnally know any female under the age of forty-five years, and every female under the age of forty-five years who shall consent to be carnally known by any man who is epileptic, imbecile, or feeble-minded, shall be imprisoned not more than three years.

Michigan, Revision 1897.

Section 8593. No insane person or idiot shall be capable of contracting marriage.

And by Section 8616, if solemnized within the State, declared to "be absolutely void without any decree of divorce or other legal process."

New Jersey Laws, Session of 1902.

Chapter 137. I. It shall be unlawful hereafter for any person who has been confined in any public asylum or institution as an epileptic or insane or feeble-minded patient to intermarry in this State without a certificate from two regularly licensed physicians of this State that such person has been completely cured of such insanity and that there is no probability that such person will transmit any of said defects or disabilities to the issue of such marriage; and any person of sound mind who shall intermarry with such epileptic, insane or feeble-minded person, with knowledge of his or her disability, or who shall advise, aid, abet, cause or assist in procuring any marriage contrary to the provisions of this act shall be guilty of a misdemeanor.

North Dakota, Revision 1905.

Section 4043. CAUSES FOR ANNULING MARRIAGE. Where either party was of unsound mind unless such party after coming to reason freely cohabited with the other as husband or wife.

Delaware, 1897, Chapter 221.

Section 1. That a marriage may be annulled for any of the following causes existing at the time of the marriage,

(E) Insanity of either party, at the suit of the other, or at the suit of the committee of the lunatic, unless such lunatic after regaining reason has confirmed the marriage: Provided that where the party compos mentis is the applicant, such party shall have been ignorant of the other's insanity at the time of the marriage, and shall not have confirmed it subsequent to the lunatic's regaining reason.

Section 4. (G) "Hopeless insanity of husband" ground for divorce from bed and board.

The following is the law in the State of Indiana :

A Bill for an Act, entitled an act to prevent procreation of confirmed criminals, idiots, imbeciles, and rapists; providing that superintendents and boards of managers of institutions where such persons are confined shall have the authority and are empowered to appoint a committee of experts, consisting of two (2) physicians, to examine into the mental conditions of such inmates.

Whereas, Heredity plays a most important part in the transmission of crime, idiocy and imbecility;

Therefore, Be it enacted by the General Assembly of the State of Indiana, That on and after the passage of this act it shall be compulsory for each and every institution in the State, entrusted with the care of confirmed criminals, idiots, rapists, and imbeciles to appoint upon its staff, in addition to the regular institutional physician, two (2) skilled surgeons of recognized ability, whose duty it shall be, in conjunction with the chief physician of the institution, to examine the mental and physical conditions of such inmates as are recommended by the institutional physician and board of managers. If, in the judgment of this committee of experts and the board of managers, procreation is inadvisable and there is no probability of improvement of the mental and physical condition of the inmate, it shall be lawful for the surgeons to perform such operation for the prevention of procreation as shall be decided safest and most effective. But this operation shall not be performed except in cases that have been pronounced unimprovable. Provided, That in no case shall the consultation fee be more than three (3) dollars to each expert, to be paid out of the funds appropriated for the maintenance of such institution.

The State of Oregon has enacted a duplicate bill.

The following bill is now under consideration in the State of Connecticut:

House Bill 123 [Tomlinson, Danbury].

"An act concerning Operation for the Prevention of Procreation," providing for the appointment on the staff of all institutions in the state in which are confined criminals, idiots, rapists and imbeciles, of two skilled surgeons of recognized ability who may, if deemed advisable after consultation, perform such operations as shall be deemed safest and best and most effective for the prevention of procreation.

Substitute Bill as passed.

Section 1. The directors of the state prison, and the superintendents of the state hospitals for the insane at Middletown and Norwich, are hereby authorized and directed to appoint for each of said institutions respectively two skilled surgeons, who, in conjunction with the physician or surgeon in charge at each of said institutions, shall constitute a board the duty of which shall be to examine such inmates of said institutions as are reported to them by the warden, superintendent, or the physician or surgeon in charge, to be persons by whom procreation would be inadvisable. Such board shall examine the physical and mental condition of such persons and their record and family history so far as the same can be ascertained, and if, in the judgment of a majority of said board, procreation by any such person would produce children with an inherited tendency to crime, insanity, feeble-mindedness, idiocy, or imbecility, and that there is no probability that the condition of any such person so examined will improve to such an extent as to render procreation by any such person advisable, or if the physical or mental condition of any such person will be substantially improved thereby, then said board shall appoint one of its members to perform the operation of vasectomy or oöphorectomy, as the case may be, upon such person. Such operation shall be performed in a safe and humane manner, and the board making such examination and the surgeon performing such operation shall receive from the state such compensation for services rendered as the warden of the state prison, or the superintendent of either of such hospitals, shall deem reasonable.

Sec. 2. Except as authorized by this act, every person who shall perform, encourage, assist in or otherwise promote the performance of either of the operations described in section one of this act for the purpose of destroying the power to procreate the human species, or any person who shall knowingly permit either of such operations to be performed upon such person, unless the same shall be a medical necessity, shall be fined not more than one thousand dollars, or imprisoned in the state prison not more than five years, or both.

DISCUSSION.

MR. ALBERT GARVIN (Wethersfield): I do not know how I can discuss this paper in five minutes or, for that matter, in five hours. Dr. Carmalt came up to see me, and asked me to discuss his paper. I am in rather an unfair position, as there are practically no statistics of the relation of heredity to crime in the United States. In 1904, the Census Bureau got out the first report on the subject. Other than that, there is actually none, and the existing ones, the Jukes and the Tribe of Ishmael, do not amount to much.

I take it that Dr. Carmalt meant to leave the impression that criminals are born criminals; that is, that criminals produce criminals. I do not believe that 3 per cent. of the inmates of the State Prison at Wethersfield, or any place else north of the Mason and Dixon line, have been produced in this way. I have not seen, in the ten years that I have had charge of that prison, the son or daughter of a criminal. I have in there to-day a mother and son and a father and son who came in for committing the same crime; but the criminal degenerate (that is, the feeble-minded and the epileptic) are with us, and increase in a proportion that is large. We received two or three epileptics in the last three months, practically responsible for the crime committed, but in a measure irresponsible.

Lombroso divides criminals into six classes: The born, the insane, the simple minded, the crank, the half crazy and the occasional criminal, and says that 65 per cent. of all criminals belong to the occasional class.

Our average population last year was 559. Ten per cent. of these had previous criminal records. Sixty-two per cent. had committed crimes against the person and 38 per cent. against property.

The Minnesota State Prison with a population of 665 (with the reformatory element, first offenders between the ages of 16 and 30 out) reports 39 per cent. who committed crimes against the person and 61 per cent. against property, with 10 per cent., the same as this state, recommitments.

In each state there is a large foreign element; Minnesota, Swedes and Norwegians, while in Connecticut they are mostly of the Latin races.

There is no possible way of finding out about the criminals that come from Europe. If they are physically all right, they get into this country. Frequently they are in prison by the time they have been here one year, two years, or three years. If we did here as they do in Canada, it would be better. When men come over from London who are found to be thieves and rascals, they pardon and deport them.

Naturally, the higher the form of life, the less efficient the physical inheritance. However, environment has more to do with the formation of criminals than has anything else. Dr. Carmalt beautifully illus-

trated his remarks by a reference to the Jukes family. I should like to mention some records showing the effect of environment. Thirty years ago, many children of criminals were sent West from Five Points, New York City, and placed in good homes. The records of two carloads of these children were carefully kept. In these new homes, they had the same advantages as other children. When the girls were eighteen and the boys twenty-one, their conditions were morally, mentally and physically as good as that of children born in the community in which they lived. Environment has much to do with it. If you will take from the worst family a strong child, with no seeds of disease, that child will make good, if its surroundings are all right.

I just want to mention one or two other cases. I have executed at the prison thirteen men, and have seen a number of others executed. I could not get the history of all these men. One was undoubtedly a hereditary criminal degenerate. His father was a thief and a drunkard; his mother, a drunkard and prostitute. He was well developed and did not show any of the earmarks. The others, I am not sure of.

As to the remedy, I would advise sterilization for third commitments to prison, and for epileptics and feeble-minded of both sexes. Unless we absolutely stop the breed of criminals and the feeble-minded, it will be very difficult to find means to take care of this numerous class of the population.

DR. GEORGE H. KNIGHT (Lakeville): This subject of Dr. Carmalt's is so vast and so important a one, in our social and economical conditions and the problems of the day, that it is not possible for anyone to discuss it in five minutes, and I have thought that the most valuable thing, perhaps, to you in the Society would be a few statements of facts. At the present time, with the increased knowledge that has come along with civilization concerning medicine and drugs and better hygiene, and with the ideas of all humane people that we should do what we can to preserve the unfit, we have reached what seems to me a critical point in our civilization. We no longer do, as was done in olden times, put an end to the life of the unfit baby; nor do we have the scourges or ravages of epidemics to take away thousands of the unfit. We have reached the point where we have got to do something, and I want to give you a few facts about some things of interest in this connection, starting with our institutions.

A few years ago, I saw the statement that two out of every five of the population of the United States were receiving either care at some of our institutions or some other form of charity, and I have never seen that statement refuted. Of course, we are giving charity in a much better way than formerly. I do believe that public charity, as it used to be dispensed, was very harmful. In our insane asylums in Connecticut to-day, there are confined from 50

to 70 per cent. of our insane population, our homeless paupers and demented. In some of our reformatories in the different states, I have been told than 37 per cent. of those received into these institutions are mentally defective. Now this, gentlemen, is getting to be a serious position. We have reached a point to-day in Connecticut where, in the case of an attack of acute mania, we have no room in our insane asylums in which that person can be accorded the care he should receive.

I am not criticising this; but we are doing nothing to prevent this increase in crime and pauperism, and I believe that this and the increase in the defective class is out of all proportion to the increase in population. Something must be done. We have even got to place on our statute books some law which can be enforced that will prevent the marriage of the unfit, or we have got to pass the law that Dr. Carmalt suggests. It is a question in my mind whether it would not be a proper law. Some such law must be on our statute books, or we shall soon reach a point where our civilization will not be able to stand the strain.

DR. CHARLES C. BEACH (Hartford): Living organisms being moving bodies are subject to the same law as are all moving bodies. All living organisms, whether plants or animals, are acted upon by two forces, heredity and environment, and the resultant partakes of the character of the predominating force. This you can see in life, in which the struggle for existence and sustenance and the propagation of the species produces selfishness. All evil is due to selfishness. The Bible says that the love of money is the root of all evil, but the love of money is itself selfishness. This is the result of heredity, and it is found in all forms of organic life. The plant growing on the cliff will crush out of existence another plant, though not capable of reasoning. Altruism is the result of the refining influence of civilization.

Take a child of vicious parents and it will inherit certain tendencies, though it may not necessarily become a criminal. If such a child is placed in a proper environment, it may be sufficient to overcome the hereditary tendency. This, however, is not always feasible. Many such children grow up in an environment as vicious as their heredity. The result is that the two forces working together are almost sure to produce a criminal.

If environment will produce such a change for the better, you ask, why destroy the breed? Take these children away from their parents and place them in better surroundings. To this I would say that the institutions we have are not sufficiently capacious to check this increasing evil. We have, however, a method of checking it, which has been introduced in certain states, particularly Indiana, where the male is sterilized by vasectomy. I have some literature upon this point, and the reports show that 400 such operations were performed by Dr. Sharp. The men's freedom is not interfered with; they can gratify

their desires, but they cannot bring into the world other human beings. I can see no reason why this operation should not be performed. It is no more wrong to do this than to remove the ovaries in women in order to hasten the menopause. The majority of the men upon whom Dr. Sharp performed the operation have come back to him and thanked him for doing it, and have advised others to have it done. I cannot see why it is any worse to perform vasectomy than to execute a criminal.

DR. W. L. HIGGINS (South Coventry): I should not have been here to-day to have said a word regarding this interesting paper, but for the fact that there is, at the present time, before the General Assembly of Connecticut a bill which looks to the performance of sterilization upon males of the criminal classes. The few facts that I looked up hastily yesterday in connection with this matter were gotten together to present to the General Assembly and not for the present occasion.

I have been much interested in the proper treatment for this class of people. The idea is not a new one. As long ago as 1855, in the Territory of Kansas, a law was enacted by which, if a negro or mulatto attempted or committed rape on a white woman, or compelled her to be his wife or his concubine, or made a prostitute of her, he was, on being found guilty, sentenced to be castrated by a skillful surgeon. That law, of course, referred only to castration; it was not the plan of sterilization referred to by Dr. Beach. Twelve years ago, the States Prisons Association of the United States, at their annual meeting in Austin, Texas, through a committee appointed by them, recommended this procedure known as sterilization of the male.

There is an important responsibility resting upon the physicians of this State. The subject is not simply an economic question; it is not simply a question for medical or legal jurisprudence, it seems to me. There is something far weightier back of it, and this is summed up in the expression that one of the most sacred of the natural rights of man is the power to beget offspring. To whom shall be delegated the responsibility of drawing the line of demarcation? It is, in my opinion, a weighty responsibility; and if, in continuation of this line of thought, it is illegal and wrong to commit abortion to prevent conception, except for certain legal and recognized reasons, if onanism is wicked, and if masturbation is injurious, who shall say, no matter how remote the remedy to prevent the propagation of the species of the criminal may be, that it is not eternally wrong?

DR. JAMES M. KENISTON (Middletown): Dr. Carmalt's paper is timely and brave. It requires not alone careful thought but a high degree of moral courage to recommend, in conservative New England, the prevention of crime by sterilization of the criminal. I believe firmly that the doctor's recommendation is really a prophecy of what the "land of steady habits" will do. In a paper read before the

American Medico-Psychological Association in 1908, on "The Care of Imbeciles," I "believed that all imbeciles and idiots should be *registered* and *under state control*. This need not be attended with undue publicity, and would be valuable in enabling the authorities to know the extent of this incubus and to adopt legal measures to prevent marriages and even the procreation of illegitimate as well as legitimate children." The present law in Connecticut in regard to marriage of paupers, imbeciles, epileptics, etc., should be enforced.

To-day in this country we have at least 150,000 imbeciles and between 50,000 and 100,000 epileptics. There is a large but not yet fully known number in our prisons and jails. Add to these 150,000 or more insane, and the paupers, the vagrants and the incorrigible criminals, and it is a very conservative estimate that we have at least one million "undesirable citizens." These should be treated in a manner to prevent the moral burdens forced on us, to say nothing of the financial side.

Dr. Walter E. Fernald has a very instructive paper on "The Imbecile with Criminal Instincts," in the *American Journal of Insanity* (Vol. 65, No. 4, p. 731, April, 1909). His *remedy* is *life-long* care and supervision. He does not allude to sterilization. Nature wipes out some families of alcoholics, but Nature works too deliberately to suit our modern progressiveness. We assist Nature (with a capital N) in bodily diseases; why not in mental and moral infirmities? As a writer in the *Outlook* said recently: "Let us hear less of the Hivites and Jebusites, and more of the people of to-day and the problems they present." Judged by modern ethical standards many of the old Biblical worthies would now be regarded as unmitigated scoundrels, and some, not only south but even quite a bit north of Mason and Dixon's line, would be lynched.

The people are coming to an intelligent comprehension of the criminal and the delinquent. They will demand a sure remedy. Shall not we as a body endorse either Dr. Carmalt's method, or one equally humane and sure, if such a substitute can be found?

DR. F. T. SIMPSON (Hartford): This is a subject in which we have to feel our way along and begin very conservatively; and I should say that we should be more justified in applying this measure to the mentally defective than to the criminal, if it is true that only 3 per cent. of criminals are so by heredity. There are a larger number of imbeciles than of criminals in the State. We have an equal number of epileptics. Experiments have been made in various institutions along this line. In Massachusetts, Dr. Flood sterilized twenty-six boys. The improvement in disposition in every case was notable. The cure of the epilepsy in quite a proportion of cases was also secured. We may look upon it as a helpful proceeding. If we take it on the right ground that we are then acting in the interest of the individual,

we can gradually move along to the point at which we can do it in the interest of society at large. Many criminals themselves will apply for it for the relief of their own troubles.

DR. W. H. CARMALT (New Haven): Do not understand me to say that criminals (always) produce criminals, or on the other side that criminals are the offspring (invariably) of criminals, but that criminals are to be considered as arising from and belonging to the degenerate class; becoming criminals by easy stages later. Not inheriting moral and intellectual impulses or forces to resist, they succumb to their opportunities or environment, which those of a better heritage shun or overcome. The ordinary criminal is not born such, though there are instances, exceptional to be sure, of juvenile depravity that compel one to that view in individual cases, but they are *all* weak morally, and in the main intellectually; those who exhibit intelligent characteristics show it in cunning rather than in force.

As to the particular operation, whether castration or vasectomy, that may be left to a proper judicial tribunal. I am not arguing for it as a punishment for crime, but for what is manifestly and demonstrably an inherited fault in the make-up of the nervous system. I would stop the breeding of imbeciles, degenerates and insane whose offspring become also criminals.

Dr. Beach has just handed me the form of application for a marriage license necessary in the State of Indiana, in which is this question. "Is the male contracting party afflicted with syphilis or any other transmissible disease?" Presumably *first*, if an affirmative reply is given the license is refused, and *second* the active stage of syphilis is intended; but transmissible is a word of very elastic significance and is the crux of this whole subject. No physician who has the opportunity to study nervous diseases in any quantity, in the various institutions for the care of this class of diseases, insane hospitals, hospitals for the care of the feeble-minded, colonies for epileptics, etc., questions the heritable nature of a whole lot of nervous diseases. In the children of these degenerates their forms are protean, and just as in hereditary syphilis their manifestations may not be for years after birth, so does insanity or epilepsy or degeneracy frequently first show itself after the age of puberty when they can beget their kind again *ad infinitum*. The forbidding of a marriage license under these conditions doesn't stop the propagation of their kind, it simply tends towards the much worse condition of illegitimacy. I am arguing for a more radical treatment of the subject;—to the stopping of the breeding of the class. The individual is an object of charity to be cared for, and so far as possible lifted from his inheritance; the breed is to be exterminated by prevention.

Compensatory Hypertrophy of the Small Intestine Following Resection of Large Portions of the Jejunum and Ileum.

JOSEPH MARSHALL FLINT, M.D., NEW HAVEN, CONN.

(From the Surgical Laboratory of Yale University and the Continuous Surgical Service of the New Haven Hospital.)

In these days of aggressive surgery, it is important to know the limits of resection of various organs and tissues and particularly to be familiar with the response which the organism makes to the loss of large portions of them by reason of either surgical interference or disease. Response to injury or destruction of organs or tissues, either in whole or in part, may be met by several compensatory processes of which the regeneration of the lost or injured portion represents the most perfect type of compensatory action. In other instances, a hypertrophic process is inaugurated either in the remaining portion of the organ or tissues, or sometimes in its mate in case the structure is bilateral.

In general, we now distinguish two kinds of hypertrophy: functional, when a part becomes enlarged through use; and compensatory hypertrophy, when an organ or a part of it is removed and the remainder or its mate hypertrophies in consequence. Naturally the compensatory hypertrophies may also be viewed as the result of extra work caused by the removal of the organs or a part of them. Although superficial, this distinction between the two processes is not unhelpful, as, in the compensatory hypertrophy, we are usually dealing with an adaptation to neutralize a pathological condition or to offset the effect of an injury. A further useful morphological differentiation of the hypertrophic process was introduced by Virchow, who speaks of hypertrophy in the sense of an enlargement of the cells and of hyperplasia as indicating an

increase of the number of cells of which the tissue or organ is composed.

Still another type of compensation, which seems to be vicarious in nature, is where one organ may show compensatory action on behalf of another from which it may be, so far as we know, physiologically different. Of this type of compensation, we know least, although it will form one of the most interesting chapters in the future development of experimental medicine.

To determine which of these compensatory processes was involved, some eleven years ago, at the suggestion of Dr Mall, Dr. R. F. Rand and myself began to study the effect of removing large portions of the small intestine. Our period of collaboration, unfortunately, ended with the completion of the operations, and since that time I have only had sporadic opportunities to finish the study of the preparations which we obtained and to perform such new experiments as the progress of the work demanded.

METHODS AND MATERIALS.

Dogs were selected for experiments, partly because of their well-known resistance to operative procedures, but largely because the finer anatomy of the intestine in the dog has been exhaustively studied by numerous investigators. The dogs were prepared for operation with scrupulous care and all of the usual aseptic precautions were taken. After a careful disinfection of the skin, the abdominal cavity was opened. The whole movable portion of the small intestine, that is to say, the combined jejunum and ileum, was then delivered into the wound. In this way, the duodenum and a part of the jejunum was excluded from the operation, owing to their fixation and the anatomical relations, which made it impossible either to resect or to measure them for the purposes of control in determining whether there had been a regeneration in the portion of the intestine left in the body. Accordingly, it was our custom during the first operations to mark the upper end of the jejunum by a black stitch and, from this point, the

measurements of the intestines were taken. These stitches proved, however, entirely too uncertain and, finally, we had recourse to a subserous injection of lampblack, sterilized in salt solution, which gave an indelible tattoo forming a permanent and lasting landmark from which the combined jejunum and ileum could be measured. As a preliminary stage of the operations, it was our custom to measure the whole of the small intestine from the tattoo mark on the jejunum to the cæcum. Owing to the great elasticity of the gut, this measurement could not be made absolute, so one of us, the writer, always measured the intestine by applying as nearly as possible the same tension upon the gut, while protecting it from the longitudinal shrinking that follows its exposure to the air, by means of gauze pads soaked in warm salt solution. Although there is always a slight error in the measurements, the method, nevertheless, is relatively accurate, as the determinations were always duplicated and the mean used as the determined length. In two such measurements of the intestine, there was rarely a discrepancy of more than 30 cm., which would place the average error in determining the length of the whole portion of the gut with a free mesentery at about 15 cm. As the measurements were taken, marks and measurements were made to determine the position of the upper and lower points of the portion to be resected, which gave us an additional landmark in the suture to determine whether there was a lengthening of the segment of the intestine left at operation. The mesenteric vessels were then tied and a fan-shaped piece of mesentery cut leading to the points of section. After resection of a segment, the continuity of the intestine was reëstablished by an end to end anastomosis. For purposes of control and comparison, the resected portion of the intestine, after the completion of the operation, was stretched to its measured length in the body, opened, washed, and rolled around a glass cylinder in such a way as to keep the mucosa from being injured while the specimen was being fixed and hardened in formalin.

In a later series of experiments, a functional resection of the intestine was accomplished by means of a short-circuiting

lateral anastomosis with the invagination of the upper end of the lower segment of the gut. To prevent intussusception this end is stitched to the abdominal wall. Thus the functionless portion remained in the abdominal cavity, to be compared at autopsy with the measurements taken at operation. Furthermore, an absolute comparison of the short-circuited segment with that retaining its functional activity is possible by means of the distension of both segments simultaneously with an equivalent hydraulic pressure. Dog No. 12 is an example of this series.

The metabolic disturbances following the resection of the intestine were studied by Drs. Erlanger and Hewlett, to whom were loaned Dogs No. 2, No. 9 and No. 10, and whose results will be considered in detail later. My colleague, Professor Underhill, determined the metabolic changes in Dog No. 12, upon which a short-circuiting operation was done. For the morphological changes, I have used all of the microscopic methods which might throw any light upon the changed structure of the intestine. In order to have an absolute method of comparison in studying any modifications that might occur in the mucosa, the Born wax plate reconstruction method was employed. Further details concerning the technique will be given as they may have a bearing on the interpretation of the results.

EXPERIMENT.

Dog No. 1. Female bull terrier weighing 25 pounds.

First operation December 9. About 19% of the combined jejunum and ileum, or 55cm., was resected and the continuity of the gut restored by an end to end anastomosis. Abdomen closed.

December 11. Dog running about. Appears to be in excellent condition.

December 19. First dressing. Healing *per primam*. Subcutaneous suture removed. Stools normal.

February 3. Weight 29½ lbs. Second operation: 176cm., or 61% of the original length of the combined jejunum and ileum resected. The continuity of the gut restored as in the first operation. The intestine appears slightly larger than normal, but the condition is not marked enough to afford the certainty of a hypertrophic change. Length as in the first operation.

February 13. Since the operation the stools have been soft and watery. Appetite is large and the dog displays great thirst.

February 15. First dressing. Wound healed *per primam*. Subcutaneous suture removed.

March 31 (110 days after first operation). Weight $24\frac{1}{2}$ lbs. The diarrhœa has gradually stopped, but the dog has never regained the weight shown at the second operation. The dog was etherized and killed. Upon opening the abdomen, the small intestine appeared generally enlarged. A few insignificant adhesions were found about the second suture. Otherwise the intestines appeared perfectly normal. The remaining organs showed nothing abnormal either microscopically or macroscopically. From this dog at both operations, 231cm. of small intestines had been removed. The remainder of the gut measured 118cm., making the total length with some stretching 346cm., of which approximately 66% had been removed. The measurements between our three landmarks had not increased outside of the limit of a possible error in measurement.

Dog No. 2. Male mongrel weighing 22 lbs.

Operation December 16. 80cm., or about 34.5% of the jejunum and ileum resected and continuity of the gut restored by an end to end anastomosis. Abdomen closed.

December 18. Dog running about, but does not appear to be in good condition.

December 20. First dressing. Primary union of all except the lower angle of the wound.

January 15. Dog in good condition. Weighs 21 lbs.

March 3. Second operation. Weight 23 lbs. General condition better than at first operation. 84cm., or about 36% of the combined jejunum and ileum resected.

March 7. First dressing. Dog in excellent condition, weighing $21\frac{1}{2}$ lbs. Abdominal wound broken down. Profuse yellow stools.

March 15. Wound healing well. Weight 21 lbs. Stools formed. Appetite good.

March 30. Wound entirely healed. Stools normal.

June 7. Weight $22\frac{3}{4}$ lbs. In excellent condition.

March 25 (451 days after first operation). Anæsthetized and abdomen opened. Few adhesions found about both intestinal sutures. Peristalsis active and could be observed passing over both of the healed sutures. Small intestine enlarged to what might be considered twice the normal size, but there is no appreciable lengthening of the gut. All other organs perfectly normal both macroscopically and microscopically. From this dog, at both operations, 164cm. of ileum were removed. The portion remaining at autopsy was 137cm. long, making the total length of 301cm., of which about 54% had been removed at the two operations.

Dog No. 3. Newfoundland puppy, one-third grown. Female. Weight 27.5 lbs.

January 7. Operation. 132cm. of jejunum and ileum were resected, or about 43%. End to end anastomosis. Abdomen closed.

January 16. First dressing. Weight 26.5 lbs. Upper end of abdominal wound had broken down. Stools loose.

January 24. Dog in excellent condition. Wound granulating. Stools well formed.

January 27. Dog appears sick. Has been confined to dog house owing to inclement weather. Weight 24 lbs.

February 2. Dog died. Autopsy showed that the abdominal wound had healed perfectly. The peritoneal cavity was normal. The intestinal suture had healed with a few slight adhesions to neighboring loops of intestines. Upper portion of intestine slightly enlarged above the suture. Otherwise nothing abnormal. The lungs showed extensive pneumonic areas in both lower lobes, which were the cause of death.

Dog No. 4. White mongrel. Weight 36 lbs.

January 13. Operation. Resected 209.5cm., of ileum, or about 72%. The continuity of the intestine restored by a circular suture. Closure of abdomen.

January 17. First dressing. Abdominal wound partly broken down. Subcutaneous suture removed and wound redressed. Stools fluid and copious. Appetite and thirst voracious.

January 21. Stools partly formed.

January 26. Wound granulating. Stools soft.

February 4. Dog in excellent condition. Wound healed.

February 14. Dog escaped from dog house in good condition, but was not recovered. Stools still soft.

Dog No. 5. Poorly nourished brown mongrel, three-quarters grown. Weight 14 lbs.

January 27. Operation. 183cm. of ileum or 80% resected. End to end anastomosis.

January 29. Inactive. No stools.

January 30. First dressing. Wound healed *per primam*. Scant watery stool.

February 3. Dog extremely sick. No stools.

February 4. Dog died. Autopsy revealed adhesions from the neighborhood of the intestinal anastomosis, which constricted the gut.

Dog No. 6. Large, poorly nourished mongrel bitch. Weight 29 lbs.

February 10. Operation. 295cm. of ileum, or about 91%, resected. End to end anastomosis.

February 14. Profuse watery stools. Extreme thirst.

February 16. First dressing. Weight 21 lbs. Upper end of the wound broken down. Remainder healed. Stools very profuse and watery. Dog shows great thirst.

February 20. As the animal was *in extremis*, she was killed. Weight 16.5 lbs. Autopsy showed that the sutures in the peritoneum and muscle had broken down and allowed a portion of the omentum to protrude. This induced a general peritonitis. The intestinal suture was in perfect condition.

Dog No. 7. Terrier dog. Weight 20.5 lbs.

February 17. Operation. 174cm., or 87% of the ileum resected. End to end anastomosis. Closure of abdomen.

February 20. Dog in fair condition. Stools fluid and ejected in a stream from anus.

February 26. Dog has been in poor condition for past three days. Died to-day. Whole wound broken down, with large omental hernia. General peritonitis. Intestinal sutures intact.

Dog No. 8. Puppy about three months old. Weight 22.5 lbs.

February 24. Operation. Resected 288.5cm., or about 85% of the ileum. The continuity of the intestine was restored by a circular suture. Closure of abdomen.

March 2. Died. Autopsy March 3. The abdominal wound had broken down, allowing a portion of the omentum to protrude. There is a general purulent peritonitis. The intestinal anastomosis is intact.

Dog No. 9. Poorly nourished brown mongrel bitch. Weight 29.5 lbs.

April 8. Operation. 298cm., or 83% of the ileum resected. End to end anastomosis.

April 14. First dressing. Wound healed *per primam*. Weight 26 lbs. Loose watery stools. Diet unrestricted.

May 1. Dog escaped from the dog house. Diarrhœa marked.

June 7. Recaptured. Weight 22.5 lbs. Profuse diarrhœa still persists. Stools fluid, greyish brown in color. No blood.

October 25. Weight 27.5 lbs. 5 oz. Beginning of metabolism experiments by Drs. Erlanger and Hewlett. Confined to cage. Diet of meat 100 grm. (N. = 3.543) and corn meal (N. = .907) begun.

October 31. Weight 25 lbs.

November 2. Weight 24 lbs. 12 oz. Excreta collected November 2 to November 10 inclusive.

November 10. Weight 21 lbs. 8 oz. On account of rapid emaciation of animal, experiments were stopped and an unrestricted diet given. Appetite voracious with intense thirst. On November 10 a profuse diarrhœa succeeded the constipation, which had been quite marked since the beginning of the experiment. On the night of November 10, the dog had a profuse tarry stool.

November 14 (220 days after the operation). In spite of the liberal diet the loss of weight continued with an inordinate appetite and thirst. Died between 8 A. M. and 3 P. M. The autopsy showed there had been no general enteritis. There was nothing, in fact, to explain the cause of death except the malnutrition induced by the shortened intestine and the consequent failure of the dog to absorb enough nutriment when once the balance had been disturbed by the impoverished diet given in the experiments. No appreciable lengthening of the intestine from the time of operation, but a great increase in its diameter and a hypertrophy of its walls was observed. The cause of the rapidly increasing nitrogen excretion was undetermined. Nothing was found in the intestine to explain the tarry stool.

Dog No. 10. White and black terrier bitch. Weight 23¼ lbs.

April 12. Operation. Resection of 238cm., or 81% of jejunum and ileum. End to end anastomosis.

April 20. First dressing. Wound healed *per primam*. Stools profuse and watery. Intense thirst and ravenous appetite.

June 7. Weight 21¾ lbs. Stools still soft but no marked diarrhœa.

February 28 (322 days after the operation). Dog killed for examination. She had been shipped by express from Baltimore to Chicago, where, from lack of suitable quarters, she was confined in the attic of the laboratory. A profuse diarrhœa soon supervened, which was so severe as to induce an extensive prolapse of the rectum. This preceded the autopsy by a month. The latter showed that there had been no increase in the length of the intestine outside of the possible errors in measurement, but a marked increase in its diameter was observed. The walls of the intestine were thickened and hypertrophied. The intestinal suture was perfectly healed, but showed a few adhesions to adjacent loops of intestine. Excepting the prolapse of the rectum, all other organs were normal, both macroscopically and microscopically.

Dog No. 11. Quarter grown St. Bernard puppy. Weight 31 lbs.

April 14. Operation. Resection of 364cm., or 85% of ileum. End to end anastomosis.

April 18. First dressing. Abdominal wound broken down. Stools profuse and watery. Animal extremely thirsty.

May 2. Dog died. Autopsy revealed a walled-off abscess originating from the intestinal suture. No general peritonitis.

Dog No. 12. Mongrel bitch.

July 22. Operation. Short-circuiting of 237cm. of ileum. Upper end of lower segment stitched to abdominal wall on left side. Lateral anastomosis of upper segment to ileum just above the cæcum.

August 1. First dressing. Wound healed *per primam*. Since the operation there has been a profuse diarrhœa. Stools profuse and watery.

August 11. Diarrhœa continues. Great thirst and ravenous appetite.
January 8. Dog loaned to Dr. Underhill for a study of the metabolic changes. Weight 7.4 kilos.

February 22 (214 days after the operation). Dog has never regained her original weight. During the summer and fall she has seemed well and has not suffered from diarrhœa. With the onset of cold weather, the diarrhœa recurred and she has gradually lost weight and now appears very emaciated. Etherized and killed. On opening the abdomen, the conditions shown in Fig. 1 were found. Subcutaneous fat had almost entirely disappeared. The stomach was enormously dilated with food, and the omentum atrophic. The short-circuited intestine was empty and of normal size. The functional portion of the intestine, however, was practically double the size of the short-circuited part. The large intestine was apparently normal. All other organs were normal. Total length 324cm., short circuit 237cm., functional 86cm. Functional resection of 73%.

The general results of the operations for the purpose of our study may be collected in the following table. It may be

Dog No.	Sex.	Weight lbs. Length of ileum and jejunum.	Resected.	TABLE.			Days lived.	Result.	Remarks—Cause of Death.
				% Removed.	Whole length small intestine.	% Removed.			
1	F	25 287	55	19					
1*	F	29 222	176	61	348	66	110	Recovery	Killed for observation.
2	M	22 232	80	34					
2*	M	23 175	84	36	301	54	451	Recovery	Killed for observation.
3	F	27 316	132	43			28	Died	Pneumonia.
4	M	38 291	209	72			32+	Recovery	Escaped from dog house in good condition.
5	M	14 227	183	80	252	70	9	Died	Ileus from adhesions.
6	F	29 323	295	91			10	Died	Omental hernia, peritonitis. Infection of abdominal wound.
7	M	20 198	174	87	219	79	9	Died	Omental hernia, peritonitis. Infection of abdominal wound.
8	F	22 339	288	85			6	Died	Omental hernia, peritonitis. Infection of abdominal wound.
9	F	29 357	298	83	458	65	220	Recovery	Died during metabolism experiments.
10	F	23 289	238	81	334	70	322	Recovery	Killed for observation.
11	M	31 425	364	85			17	Died	Abscess about suture.
12†	F		237		323	73	213	Recovery	Killed for observation.

* Second operation.

† Intestine not resected. Segment short-circuited by enteroenterostomy.

well to recall, however, that the measurements are only approximate, as it is impossible to measure absolutely an elastic organ in the body of a living animal. Furthermore, the recorded length is perhaps considerably greater than normal, as the intestine, during the measurement, was put under slight tension to counteract the effect of the action of the longitudinal layer of the Tunica muscularis.

In all, fourteen operations are recorded, two of them being upon dogs from which a portion of the gut had already been removed. Of the fourteen operations on twelve dogs, six died from all causes, making a total mortality of 42 per cent. In no case, however, could the resection of the intestine *per se* be looked upon as the direct or primary cause of death, although it might naturally be considered a contributory factor in reducing the resistance by causing profound metabolic disturbances, as was evidenced by the extreme diarrhœa and loss of weight. From the table and protocols given above, it will be seen that three died from infection resulting from a breaking down of the abdominal wound; one died from ileus in consequence of adhesions about the intestinal suture; one died from an abscess near the suture; one died from pneumonia, and the last from inanition, induced by the metabolism experiments, after living 213 days.

From the general clinical observations on the operated animals, we find that relatively large portions of the small intestine in dogs may be removed without danger to life of the animal. The maximum is difficult to determine, as the immediate effect of the operation would, no doubt, depend to a great extent on the general condition of the dog at the time the resection was made. But this much can be said; dogs from which about 70 per cent. of the entire small intestine, or about 80 per cent. of the combined ileum and jejunum have been removed, or short-circuited (dogs No. 1, No. 9, No. 10, No. 12), may live indefinitely after the operation. The first effects of the operation give a profuse diarrhœa and loss of weight, from both of which the animal slowly recovers. At

the same time, the resection of a smaller amount, *i. e.*, 65 per cent., of the entire intestine (Dogs No. 9 and No. 12), may lead, notwithstanding a ravenous appetite and an unlimited diet, to changes which prevent the dog from regaining its former well-nourished condition. In these animals the nutrition may be apparently normal, but they are, nevertheless, so sensitive to dietetic disturbances that a diet or conditions of any severity may introduce a fatal marasmus or enteritis (Dogs No. 9 and No. 12). Young growing animals (Dogs No. 3, No. 8 and No. 11) apparently do not stand the operation for the removal of large amounts of the intestine as well as older dogs, and those cases (Dogs No. 1 and No. 2) where two operations were performed, that is to say, where the resection was fractional, recovered sooner and with greater ease than where the entire resection was made at one sitting.

METABOLIC EXPERIMENTS.

A number of months after the operations, three dogs, No. 2, No. 9, and No. 10, were loaned to Drs. Erlanger and Hewlett,¹ who wished to study the effects of shortened intestines upon metabolism. Their results have already appeared in another place and, from this paper, the following brief summary of their conclusions may be given. In their series No. 1 corresponds to our No. 2, No. 2 to our No. 10, and No. 3 to our No. 9. Owing to a misunderstanding of our methods of numbering the dogs and the operations separately, the corresponding figures are incorrectly given in their paper. When an easily absorbable diet is given, dogs with shortened intestines behave like normal dogs. The fat and nitrogenous content of the fæces may not exceed the normal. Upon increasing the fat in the diet, however, the abbreviation of the intestine shows its influence on the power of absorption. Under these conditions, the percentage of both fat and nitrogenous material in the fæces may reach a fourth of that which is ingested in the diet. Notwithstanding this fact, the animals increased in weight, as relatively a large amount of

¹ Erlanger and Hewlett: *Am. Jour. of Phys.*, Vol. 6, 1901.

fat is absorbed. The diminished absorption is simply an index of the effect of resecting large portions of the intestine upon the power of absorption, which may also become evident when the ordinary diet contains many undigestible substances.

Neither in quantity, specific gravity or nitrogenous contents did the urine of dogs with shortened intestines show any differences from that of normal animals. There was, however, an absolute increase in the quantity of the conjugated sulphates and a relative increase in the alkaline sulphates, indicating an excess of intestinal putrefaction. In Dog No. 2, from which 54 per cent. of the entire small intestine had been removed, there was no marked increase in the quantity of fæces. In Dog No. 10, however, from which 70 per cent. had been resected, there was an increase in the amount. In both dogs, the percentage of water in the fæces was equal to or only slightly in excess of that in normal dogs, which is in contrast to the increased percentage in dogs deprived of the large intestine (Harley). The shortening of the intestine has no effect on the absorption of fat when the animal is on a diet poor in fat. As this element of the diet is increased, the fat in the fæces may increase to 25 per cent. of the quantity ingested as against 4.5. per cent. in a normal dog. This increase, in normal animals, does not markedly accentuate the elimination of nitrogenous material in the fæces. With a shortened intestine there is an increase which may equal an amount double that eliminated by a normal dog, although on a diet poor in fat there appears to be no great difference between the two.

De Filippi² studied the metabolic changes in a dog from which Monari had removed seven-eighths of the small intestine and in which only one-eighth of the combined ileum and jejunum remained. In this instance he found that the carbohydrates were completely utilized, that the nitrogen loss was not much greater than in normal dogs, while the continued diminished fat absorption (19 per cent. of the total amount

² De Filippi: *Arch. Ital. de Biol.*, 1894.

ingested recovered in the fæces) made a richer diet for the animal necessary.

Of special importance in connection with the investigations of De Filippi and of Erlanger and Hewlett are the observations of Diliberti-Herbin,³ who removed one-half of the jejunum and ileum from two dogs. In one instance he removed the jejunal half, while in the other the lower half was resected. Unlike the other investigators, Diliberti-Herbin was able to conduct experiments on his animals from the time of the operation and found that the nitrogen and fat excretion varied from 33 per cent. to 66 per cent. and remained high for a long period. Ultimately, however, the conditions became more normal.

The results of the metabolism experiments on dogs may be tabulated as follows:

Investigators.	Animals.	Resection.	Percentage of Diet Nitrogen in Fæces.	Percentage Diet Fat in Fæces.	Perc. Diet Carbohydrate in Fæces.
De Filippi	Monari's dog.	190 cm.	Slightly increased.	19%	None.
Erlanger and Hewlett	Dogs Nos. 2, 9, 10	54%, 65%, 70%	Normal to 25%	Normal to 25%	
Diliberti-Herbin	His own.	50%	33% to 66%	33% to 66%	
Underhill	Dog No. 12.	73%	25.9%	27.7%	None.

From these observations, a number of interesting facts may be found which explain the clinical observations made upon our dogs. The resection of large amounts of the intestine, by diminishing the absorbing surface of the gut, disturbs the balance in the nitrogen and fat absorption and leads to an excessive excretion of these elements in the fæces, an increase which may reach two-thirds of the quantity ingested. This accounts for the profuse diarrhœa invariably observed after the operation. Owing to the limited surface for absorption

³ Diliberti-Herbin: *Gazz. med. Ital.*, 1904. Cited *Centralbl. für Chirurgie*, 1904.

of nutritive substances, the animals are, for a time, forced to consume the nitrogen and fats of their own tissues. Gradually, however, a balance is restored and the excessive excretion of these elements diminishes, until, as Erlanger and Hewlett have shown, the animals, with the exception of an increased intestinal putrefaction, may return to practically normal nutritive conditions. That this restoration of the power of absorption is not complete, however, may be shown by the susceptibility of the dogs to either diets containing indigestible substances, or to diets rich in fats, which lead to diarrhœa and an excessive excretion of both nitrogenous and fatty elements of the foods. Thus the compensatory mechanism is apparently effectual under favorable conditions of diet and life, but the result is by no means as efficient as the power of absorption of a normal intestine.

In contradistinction to the fat and nitrogen metabolism, however, the carbohydrates in the diet appear to be completely utilized after the compensation has been established (De Filippi, Underhill). It would appear that we have in carbohydrates a more easily assimilated food which can be utilized by animals with shortened intestines even when fats and nitrogen are excreted in a percentage above normal. In his experiments, Underhill quadrupled the amount of an ordinary carbohydrate diet for a dog of this weight and still obtained no test. During the metabolism experiments the dog had soft stools and Underhill observed the water content of the fæces varied between 80 and 84 per cent., which is about 5 to 10 per cent. above normal. The practical significance of these observations should not be overlooked and will be commented upon later. What the immediate effect of the resection would be on the carbohydrate metabolism is unknown, but will be studied by Professor Underhill in another series of dogs.

The increased putrefaction is undoubtedly due, as Erlanger and Hewlett point out, to the fact that the food remains for a longer period, under the altered circumstances, in the large intestine, exposed to the action of the bacteria, for these dogs after the compensation is established have only the normal

number of stools per day and may even be constipated (Dog No. 9).

Besides the experiments on the metabolism of dogs with shortened intestines, there have been several cases reported where observations were made upon the modifications of the nutritive processes after extensive resections of the human ileum. An account of these cases is of particular interest, not only for the confirmation which they bring to the observations made upon animals, but because they make it probable that the results obtained from animals may be also applied to man.

Sagini⁴ carried on metabolic experiments upon a patient of Ruggi's, a boy of eight years, from whom the latter had removed 330cm. of small intestine in three sittings. His observations extended over two three-day periods. The first series gave a nitrogen excretion of 5.9 per cent. and a fat excretion of 12.1 per cent., results which were practically normal according to this investigator. The second series yielded a nitrogen excretion of 13.2 per cent. and a fat excretion of 15.3 per cent. The averages of these two series of estimations were 9.5 per cent. for the nitrogen elimination and 13.7 per cent. for the fat excretion. About the same time, Riva-Rocci⁵ studied the metabolism of Fantino's patient, who was sixty years of age and from whom 310cm. of the combined ileum and jejunum had been removed. The experiments began eighteen days after the operation and lasted two weeks. The nitrogen loss varied between 24 and 40 per cent., with an average of 29 per cent., while the fat excretion varied between 17.2 and 34.3 per cent., with an average of 23 per cent. These amounts are somewhat in excess of Riva-Rocci's normal, but, notwithstanding, the patient continued to gain in weight and make an uninterrupted recovery. Riva-Rocci therefore concludes that the removal of 300cm. of the small intestine may effect the metabolism, but not to a sufficient extent to complicate recovery or affect materially the health of the patient.

⁴ Cit., Riva-Rocci: *Gaz. med. di Torino*, 1896.

⁵ *Gaz. med. di Torino*, 1896.

Schlatter⁶ removed 192cm. of gangrenous intestine from an Italian, who was suffering from a stab wound of the abdomen. In the metabolism experiments which Platt carried out on this case, the nitrogen excretion was 10.47 per cent. and the fat excretion 13.93 per cent. The patient recovered and gained in weight. His digestion was considerably impaired, however, and special, easily assimilated food was demanded. Moreover, the patient tired easily and never succeeded in establishing a true metabolic compensation for the lost intestine. Schlatter concludes, therefore, that the digestive processes may be seriously disturbed by the resection of more than 200cm. of small intestine in young persons unless a rich diet can be provided. Later, Schlatter communicated by letter to Albu⁷ the fact that his patient had been, after some two years, so improved that he could live in health upon the ordinary frugal diet of his people (Italians). The improvement had been slow, similar to the gradual recovery of the power of absorption by dogs with shortened intestines.

The case of Lexer, from which 200cm. of small intestine had been resected, was observed by Albu,⁸ who studied the metabolism changes following the operation. The diet which he gave his patient contained 17 grams N., 88 grams fat, 328 grams carbohydrates. Of this amount, the patient lost 10.12 per cent. of the diet nitrogen and 10.1 per cent. of the fat in the fæces. The indican was normal in the urine and, therefore, there was probably no increase of intestinal putrefaction. From his study of this case of Lexer, Albu concludes that not more than one-third of the small intestine may be removed without danger to the nutrition, even when that third is computed on the relative length of the intestine to body weight.

One of the most extensive successful resections of the human intestine was made by Nigrisoli, who removed 520cm. of the

⁶ Schlatter: *Correspondenzblatt f. Schweiz. Aerzte*, Bd. 29, 1899.

⁷ Albu: *Berl. klin. Woch.*, 1901.

⁸ Albu: *Berl. klin. Woch.*, 1901.

small intestine for adhesions and stricture. Vitali⁹ studied the metabolism on Nigrisoli's case in a series of observations beginning twenty-two days after the operation and lasting some twenty-three days. During this period the patient gained some 5 kilos, but Vitali observed, notwithstanding, an increase in the excretion of nitrogen and fats to an extent slightly above normal, as well as an increase in intestinal putrefaction as indicated by the excess of the ethereal sulphates in the urine, thus confirming on man the observations of Erlanger and Hewlett on our dogs. Besides Brugsch, whose work will be described later, Vitali was the only investigator who studied the carbohydrate metabolism on human beings. These substances, like the nitrogen and fat, were also excreted in excess of the normal, a fact, it will be observed, which does not correspond to the metabolic studies on animals with shortened intestines, at least after the compensation has been established.

Zeidler operated upon a young man aged twenty, with a large scrotal hernia in which the contents of the sac had become incarcerated, resulting finally in torsion and gangrene of the intestine. Resection of 318cm. was necessary. The patient made a good recovery, and two months after the operation Spassokukozkaja¹⁰ studied the nitrogen metabolism, which he declared was normal. In the abstract, no mention is made of any observations upon the fat or carbohydrate metabolism,

A carefully worked up case of resection of 475cm. of the small intestine is reported by Axhausen,¹¹ who removed this large segment of the ileum for volvulus and gangrene in a young woman aged eighteen. This operator measured the remaining portion of the intestine by handspans and estimated about 125cm. of the jejunum and ileum was left after the gangrenous portion had been removed. In this case the metabolic changes were studied by Brugsch. As the patient had a tubercular process in each apex, the appetite was poor and only

⁹ Vitali: *Riv. critica di clinica medica*, 1902. Ref., *Jahresbericht f. Chir.*, 1902.

¹⁰ Spassokukozkaja: *Russki Wratsch.*, 1906. Ref., *Cent. f. Chir.*, 1906.

¹¹ Axhausen: *Mitt. a. d. Grenzgeb. d. M. u. C.*, Bd. 21, 1909.

a moderate amount of food was taken. The diarrhoea was not marked, as there were only two or three soft stools a day, fatty in character and of a silver grey color. Microscopically they showed many fatty acid and soap crystals, undigested muscle fibres, with nuclei and cross striations in good condition. The metabolism observations began sixteen days after operation and showed 36.5 per cent. of the diet fat in the fæces, of which 25.2 per cent. consisted of neutral fats, 24.8 per cent. of fatty acids and 40 per cent. of 'soaps. Of the nitrogen content of the food, 34.2 per cent. appeared in the fæces, while the carbohydrates were completely utilized, an interesting confirmation of Professor Underhill's observations on Dog No. 12. Furthermore, an increase in the amount of ferments in the stools over the normal was observed.

The patient maintained her weight for about three months, but gradually failed and died of tuberculosis six months after the operation. As Axhausen remarks, her impaired intestinal absorption was probably not without effect on the course of the tubercular process.

Another case of extensive resection of the small intestine is reported by Storp,¹² who excised 510cm. of the ileum for a sarcoma of the mesentery. There was a slight diarrhoea after the operation, the patient having two or three soft stools a day. Although this was controlled by astringents, it showed a tendency to recur. Notwithstanding, the patient gained in weight, although a microscopic examination of the stools showed more fat and fatty acid crystals than normal. Otherwise, no study was made of the balance between ingestion and elimination in this case. A short time later multiple metastases were found in various parts of the body and the patient was discharged without further treatment, owing to the hopelessness of the condition.

Denk¹³ reported the two cases of extensive resection of the ileum operated on by Brenner of Linz. The first was a case

¹² Storp: *Deut. Zeit. f. Chir.*, Bd. 87, 1907.

¹³ Denk: *Wien. kl. Woch.*, 1907; *Mitt. a. d. Grenz. d. M. u. C.*, Bd. 20, 1909.

of intussusception from polyp, for which 250cm. was removed. The patient showed no digestive disturbances. The second case is the largest reported resection in the literature, where Brenner removed 540cm. of the ileum in a woman aged sixty-one, for gangrene due to torsion of the intestine in a large femoral hernia. The patient made an excellent recovery and showed but little disturbance of her metabolism. She had about five fluid stools a day, which were bad smelling and contained much undigested food. Later, conditions improved and Denk made a test of the functional efficiency of the intestine by Schmidt's method, which indicated a normal digestion. About one and one-half years after the operation Denk repeated the test. At this time, she had from three to four soft or fluid stools a day, the latter condition occurring particularly after taking much coffee or milk. Although there was a diminished fat absorption, the patient maintained her weight and was able to do her housework without fatigue. Otherwise, the metabolism was perfectly normal.

The results of the metabolic studies on the human cases may be tabulated as follows:

Investigator.	Case.	Resection.	% of Diet N. in Fæces.	% of Diet Fat in Fæces.	Intestinal Putrefaction.	% of Diet Carbohydrate in Fæces.
Plaut	Schlatter's	192	10.47	13.91	No obs.	No obs.
Albu	Lexer's	200	10.12	10.1	Not increased	No obs.
Riva-Rocci	Fantino's	310	29.0	23.0	No obs.	No obs.
Zusch	Barth's	316	13.7-21.3	18.1-38.5	No obs.	0.54-0.61
Spassokukozkaja	Zeidler's	318	Normal	No obs.	No obs.	No obs.
Sagini	Ruggi's	330	9.5	13.7	No obs.	No obs.
Bougsch	Axhausen's	475	34.2	36.5	No obs.	0
Vitali	Nigrosoli's	520	Increased	Increased	Increased	Increased
Denk	Brenner's	540	Normal	Increased	Not increased	Trace

An inspection of this table containing the observations on those cases of extensive resection of the small intestine in man where the metabolic changes were studied, confirms, in general, the findings upon the metabolic processes in dogs with shortened intestines. There is no constant ratio between

the length of the resected portion of the ileum and the degree to which the absorption of nitrogenous and fatty substances is diminished. The difficulty in harmonizing these results is due, no doubt, to the differences in the diets on which the patients were tested and to a number of unknown factors, such as the exact length of intestine left at operation, or, in other words, the variability of the intestine, difficulties of measurements, resistance and condition of the patient, not to speak of the known variation of age, pathological conditions, etc. In general, however, the results of these observations are in accord with those upon animals. Moreover, the subsequent history of Schlatter's case, as told in his letter to Albu, indicates that the same gradual improvement observed in dogs also takes place in man. As in the observations in dogs, the increased intestinal putrefaction is undoubtedly due to the food remaining for a longer period than normal in the large intestine.

In addition to the cases on which metabolism experiments were conducted, there are many others in the literature where large amounts of the small intestine have been resected. Some of these have shown digestive disturbances and others not. As I have succeeded in finding forty instances, including the case reported in this paper, where 200cm. or more of the intestine have been removed, a list of the cases is appended together with the chief points of interest in the history.

In the consideration of this series of cases, several facts should be borne in mind. In the first place, in the measurement of an extremely elastic organ like the intestine, there has been no standard to guide the investigators who have reported the various cases. Great errors are thus unconsciously liable to exist. Furthermore, there may be extreme differences in measurement due to the viability of the gut. Living intestine, exposed to the air, will, owing to contraction of the longitudinal muscle, shrink to less than half its normal length. Dead or gangrenous gut, on the other hand, after losing its tonicity may measure much more than its norm. Another point of importance which should not be overlooked, is that successful

TABLE OF CASES OF RESECTION OF SMALL INTESTINE
EXCEEDING 200 CM.

No.	Operator and Publication	Am't Resected	Result	Metabolic Disturb- ances	Remarks
1	Lexner Berl. kl. Woch. 1900	200	Recovery	Moderate	Fibroma of mesentery
2	Flint Ileum Colon	204 55	Death	Violent	Colloid carcinoma of trans- verse colon and intesti- nal adhesions
3	Koeberlé Cent. f. Chir. 1881	205	Recovery	None	Stricture
4	Kocher Ref. Trzebicky from letter	208	Recovery	Slight	Rupture of intestine
5	Dreesman Berl. kl. Woch. 1899	215	Recovery	Moderate	Gangrene, incarcerated hernia
6	Mikulicz Rothe, Beit. z. kl. Chir., Bd. 33.	215	Recovery	None	Gangrene, hernia
7	Karlow Hygiea No. 3	215	Recovery	None	Gangrene, omental bands
8	Kouwer Ref. Jahresber. f. Chir. '98	224	Recovery	None	Gangrene, hernia
9	Monprofit Ileum Sem. Médicale, '98	230 80	Recovery	Slight	Adhesions, hernia
10	Shepard Cent. f. Chir. 1893	237	Recovery	Slight	Tumor mesentery
11	Kukula Arch. f. kl. Chir., Bd. 60	237	Recovery	None	Tumor mesentery. Recur- rence 1½ years later. Death
12	Harris N. Y. Med. Record 1902	239	Recovery	Slight	Gangrene, hernia
13	Hayes Blayney, Brit. Med. Jour. 1901	248	Recovery	Slight	Rupture of mesentery
14	Brenner Denk, Wien. kl. Woch. 1907	250	Recovery	None	Intussusception from polyp
15	Peck Ref. Harris	251	Recovery	.....	Rupture of uterus
16	Lauwers Jour. d. Chir. et Ann. d. l. Soc. Belg. d. Chir. 1901	265	Recovery	.....	Gangrene, hernia
17	Park Arch. int. de Chir. 1904	265	Recovery	.....	Gangrene following appendicitis
18	Mitchell Ref. Kelly-Noble Abdo- minal Surgery Phila. 1908	274	Death	.....	Thrombosis of mesenteric artery
19	Payr Arch. f. kl. Chir., Bd. 67	275	Recovery	None	Gangrene
20	Mayndl Ref. Kukula	284	Death	Inanition	Carcinoma of cæcum. Death 21 days
21	Childe Munch. Med. Woch. 1905	289	Recovery	.....	Intussusception from polyp
22	Lorenz Wien. kl. Woch. 1906	292	Recovery		

TABLE OF CASES OF RESECTION OF SMALL INTESTINE
EXCEEDING 200 CM.—*Continued.*

No.	Operator and Publication	Am't Resected	Result	Metabolic Disturbances	Remarks
23	Göbell Zeit. f. Chir., Bd. 77	300	Recovery	Slight	Mesenteric hernia and volvulus
24	Friedrich Medizin. Klinik. 1904	300	Recovery	.....	Septic peritonitis, short circuiting without resection
25	Fantino Riforma Medica 1902	300	Death	Inanition	Adhesions to fibroma uteri. Death 1 month
26	Fantino Gaz. Med. di Torino 1896	310	Recovery	Moderate	Gangrene, volvulus
27	Barth Zusch. Deut. Med. Woch. 1909.	316	Recovery	Slight	Ovarian tumor, fecal fistula short circuiting, later resection of short circuited loop
28	Zeidler Cent. f. Chir. 1906.	318	Recovery	.....	Hernia
29	Morton Ref. Kelly-Noble, Abdominal Surgery Phila. 1908	322	Recovery	.....	Myxosarcoma of mesentery
30	Ruggi Cent. f. Chir. 1896	330	Recovery	.....	Strangulation and adhesion. 3 operations
31	Stæhlin Annals of Surgery 1907	335	Recovery	Slight	Strangulated hernia; recovered perfectly
32	von Eiselsberg Ref. Park	350	Death	Inanition	Lived 25 days
33	Baracz Arch. f. kl. Chir. 83	350	Death	.....	Strangulated hernia, gangrene; lived 2 days
34	Werelius Jour. Am. Men. Assn., vol. 48	365	Recovery	Slight	Abortion, rupture of uterus
35	Obalinski Arch. f. kl. Chir., Bd. 48, 1894 Ileum Cæcum	365	Death	.....	Gangrene, hernia; died in 22 hours
36	Pauchet Gaz. d. Hôpitaux 1905	400	Recovery	Violent	Gangrene, hernia
37	Axhausen Mitt. a. d. Grenz. d. M. u. C., Bd. 21, 1909	475	Recovery	Moderate	Volvulus, death 6 months later, tuberculosis
38	Storp Zeit. f. Chir., Bd. 87, '07	510	Recovery	Moderate	Sarcoma mesentery; recurrence, death
39	Nigrosoli Jahresber. f. Chir. 1902	520	Recovery	Moderate	Obstruction from adhesions
40	Brenner Denk, Wien. kl. Woch.'07	540	Recovery	Slight	Gangrene, hernia

resections of large portions of the intestine are much more likely to be reported than unsuccessful attempts, giving us, in all probability, much too low a mortality.

The history of my own case is as follows:

W. J., male, aged twenty-nine, American, conductor. Admitted November 9, complaining of pain in the abdomen.

P. I.—Began one month ago with a generalized pain over the whole abdomen, paroxysmal in character, the attacks of which lasted from a few minutes to an hour. They occurred twice or three times a week and were associated with constipation. Bowels were moved with the aid of cathartics and enemas. Three days before admission, the patient was seized with an attack of pain, similar in character, but much severer than his previous seizures. The pain eased somewhat the next morning, but there were frequent attacks during the day. These gradually increased in frequency until on the day of admission they occurred every few minutes. The pain is generalized, does not radiate to the back, shoulder, or any part of the abdomen or extremities. On the day of admission, the patient vomited several times. Vomitus was greenish in color and of a sour odor. Bowels moved last before the beginning of the present attack, although on the night before admission, after taking an enema of warm water, the patient passed a few hard lumps of feces. There has been no loss of weight. Appetite has remained good and bowels have been regular until the onset of his present illness. At no time has he passed blood with his stools.

P. H.—Patient has had most of the diseases of childhood. No history of typhoid, pneumonia, rheumatism, or malaria. Had gonorrhœa several years ago. No history of lues. No history of headaches, vertigo, chronic cough, shortness of breath, palpitation, night sweats, indigestion, diarrhœa, malæna, frequent or painful micturition, or melanuria. In 1900, patient was thrown from his horse and apparently recovered. A few weeks later while on a train en route to California, he was taken sick suddenly, became unconscious, and was carried to San Francisco, where he was operated upon. He was told that he had broken a blood vessel in his back, which was tied after a large clot was removed. He related rather with pride that he had torn open his wound on the day after the operation. He was very sick and recovered only after a prolonged convalescence. His appendix was not removed at this operation. The wound was, from his description, drained for some time.

F. H.—Negative.

Physical Examination.—Patient is a well built, rather poorly nourished individual. Dorsal decubitus, respirations rather hurried, expression somewhat anxious. Pupils equal. React to l. and a. Teeth

in good condition. Tonsils not enlarged. Pharynx clear. Cervical glands not enlarged. Thyroid not felt.

Chest symmetrical. Expansion equal. Percussion note clear over both front and back. Breath sounds clear.

Pulse regular in force and rhythm, twenty to the quarter. Good quality. Vessel wall not thickened. Area of cardiac dullness not increased. PMI both visible and palpable in fifth interspace 9cm. from mid sternal line. Heart sounds clear and of normal relative intensity. No adventitious sounds.

Abdomen slightly distended. There is an irregular scar 6cm. long 3cm. outside of linea semilunaris, midway between the anterior superior spine and the costal margin. The cicatrix has the appearance of resulting from a suppurating wound. There is a slight fullness between the scar and umbilicus. Abdomen otherwise symmetrical. Respiratory movements present. No visible peristalsis or tumor masses. Panniculus poorly developed, so that abdominal musculature stands out clearly. Flanks symmetrical. Liver dullness extends from upper border of seventh rib to a point 3cm. above costal margin. Edge of liver not felt. Stomach tympany not increased. During examination there are numerous attacks of pain during which the knees are promptly flexed, but no peristalsis is visible. There is general abdominal rigidity, the right side being somewhat more tense than the left. Between the attacks, the abdomen is softer, but no masses are palpable. No constant muscle spasm, deep palpation sometimes eliciting spasm and at others not. No particular tenderness over appendix, gall bladder, or sigmoid. Pain seems generalized. Percussion much more painful than palpation. Abdomen everywhere tympanitic, except in the flanks, where the note is somewhat flat. No movable dullness.

Rectal Examination.—Prostate of normal size and consistency, not tender. Cul de sac filled with distended intestines. No inflammatory masses felt. Neither side tender to touch.

No hernia of linea alba. No inguinal, femoral, umbilical, perinaeal, or sacral hernia. No hernia in Petit's triangle.

Genitalia negative. No nodules on tibia. Reflexes normal.

Leucocytes, 10,200. Temperature 99.4°, pulse 80, respirations 28.

Urine shows nothing abnormal.

From the history of the case, the possibility of neoplasm was thought of, although owing to his age it seemed more probable that he was suffering from a partial obstruction due to adhesions resulting from the previous operation, although they had not given him the slightest trouble until the onset of the present illness.

A rectal tube was passed and a high enema of hot oil was given. Some gas and a little faecal material was passed. An hour later a stomach tube was passed full length and the enema repeated and a small

movement obtained. There was no blood and the fæces were well mixed with oil.

November 10. Patient has had two spontaneous movements and is resting quite comfortably. An exploration was advised while the patient was in good condition and accepted.

November 11. Operation. Median incision at the level of the umbilicus. The ileum in the entire right upper quadrant was found matted together by firm well-organized adhesions which also bound it to the abdominal wall in the neighborhood of the old scar. The ascending and first part of transverse colon could not be reached owing to the adhesions. Cæcum was free and appendix normal. To facilitate the liberation of the adhesions, the old cicatrix was excised and the peritoneum opened midway between the hepatic flexure and cæcum. The ileum was carefully dissected free from the abdominal wall and adjacent adherent loops liberated. In many places the union was so intimate that the muscle coat of one loop was injured and once a small hole was torn into the bowel. This was immediately closed with a pursestring suture reinforced with several mattress sutures. Approximately seven feet of small intestine were involved in this mass of adhesions. Several stenoses and loops matted together in U shapes were found. As soon as the colon was uncovered, further palpation revealed a tumor mass in the transverse colon just distal to the hepatic flexure. The tumor had a sharp constriction in the center suggestive of an annular carcinoma. Adhesions made the palpation of the glands in the mesocolon uncertain. For fear of a recurrence of the adhesions in the small intestine or necrosis of the intestinal wall where the muscular tunic had been injured, it was decided to resect the entire lower seven feet of ileum, together with the cæcum, ascending colon, and half of the transverse colon. A well-nourished point of healthy ileum was selected and an effort made to invaginate the end as in the treatment of the appendix stump. The lumen of the intestine was opened, however, and was closed with a purse string suture of catgut reinforced with silk. A well-nourished and safely closed end was thus obtained. The mesenteric vessels were caught between clamps and divided where possible and ligated with fine silk by transfixion. The division and ligation of the branches of the superior mesenteric, ileocolic, colica dextra, and colica media to the middle of the transverse colon followed, although this stage of the operation was rendered difficult by the presence of chronically enlarged glands which were probably a residue of the old peritonitis. The cæcum and ascending colon were then freed by incision of the lateral reflexion of the mesocolon. Finally, the gastrocolic omentum was incised, bleeding points ligated and the transverse colon freed from the stomach up to the point selected for the anastomosis. Here the colon was divided, cauter-

ized, and invaginated, as in the treatment of the appendix stump, without any leak occurring. The lower end of the ileum was then laid beside the transverse colon and a lateral ileocolostomy performed by means of the intestinal scissors, which I have described in another place.¹⁴ The anastomosis was accomplished without a leak. The cut edge of the mesentery of the small intestine was held to the cut edge of the transverse mesocolon by the anastomosis. Sutures were unnecessary, owing to the overlapping. It was impossible to cover the peritoneal defect left by the ascending colon with the peritoneum and ascending mesocolon, owing to the inelasticity of the peritoneum due to the old adhesions. The median wound was closed in layers, and the site of the original wound by through and through silkworm gut. A cigarette drain was passed from this wound down to the denuded area.

The resected portion of the small intestine measured 20cm. collapsed and 215cm. distended. The firm adhesions prevented the usual lengthening of the intestine when distended with fluid as is usual in such cases. The resected portion of the colon measured 55cm. On microscopic examination, the tumor proved to be a colloid carcinoma of the transverse colon, with metastases already present in the peripheral lymph spaces of the glands in the adjacent mesocolon.

The patient recovered from the ether rapidly, but was restless and complained of a great deal of pain. After morphine he seemed more comfortable. Maximum T. 99.6°, P. 100, R. 28.

November 12. Patient complains of severe pain which morphine does not seem to control. Codein acts better. There has been continuous proctoclysis since the operation. This fluid consisted of 15% glucose in normal saline. The glucose was boiled and rendered alkaline. We felt it desirable to give the patient some nourishment if possible from the time of operation. Very restless and tosses to and fro in bed a great deal. Vital signs, T. 98.4°-100.8°, P. 90-100, R. 20.

November 13. Patient still complains of considerable pain in abdomen. Abdomen soft and not distended. Proctoclysis continued. Albumen water started and well borne, as the patient was suffering from thirst. During the evening bowels moved spontaneously. Small dark fluid stool. No blood. Vital signs, T. 98.4°-99.2°, P. 80-95, R. 20.

November 14. Patient feels well this morning, but is still somewhat restless. No change was observed until this afternoon; when, while the nurse's back was turned, patient jumped out of bed and rushed to the window. Broke a pane of glass trying to climb out. Afterwards seemed somewhat irrational. This evening asked for whiskey and cigarettes. There are no signs of an alcoholic psychosis, although patient gives a history of being a heavy periodic drinker. During the day, patient had eight movements. Vital signs, T. 97°-99.8°, P. 76-90, R. 20.

¹⁴ Flint: *Arch. f. Kl. Chirurgie*, Bd. 80, 1906

November 15. Patient passed a very restless night. Still very restless, complains of pain, but in no particular spot. Abdomen soft and not distended. Morphine and codein do not seem to control him. Diarrhœa continues. Movements becoming more frequent. Patient is given soft carbohydrate diet. At 1 o'clock he was given 8cc. of paraldehyde on the assumption that his post-operative psychosis might have some relation to his deprivation of alcohol. He immediately vomited violently and complained of sharp pain in the epigastrium. His pulse rose rapidly from 80 at the time he vomited to 120 at 8 P. M. At this time, his temperature was 99.8° and respiration 25. Diarrhœa, twenty movements, some of which are involuntary.

November 16. Patient much worse this morning. Pulse remains high, temperature subnormal. Abdomen distended in both upper quadrants. Patient complains of great pain, chiefly in upper abdomen. Marked Hippocratic facies. Diarrhœa more marked, twenty-two movements, many involuntary, no blood. Dressing showed that the continual movements of the patient had caused the sutures to cut partially through. Wound reddened and some pus found around the drain. Median incision looks well. Vital signs, T. 96°-98.4°, P. 100-138, R. 20-30.

November 17. Patient much worse. Temperature remains subnormal, pulse high. Toward noon, he was almost moribund and died at 7.30 P. M.

Permission could not be obtained for a complete autopsy, but consent was given to reopen the wound.

The median wound was healing superficially, but there was a small pocket of pus in the subcutaneous tissue about one of the catgut sutures. Omentum adherent to the line of incision. General peritoneal cavity free, peritoneum glistening and of good color. Anastomosis in good condition. No leak and very little reaction about it. A loop of ileum was found driven up between the left lobe of the liver and diaphragm. The loop is kinked, but there is not complete obstruction. It is covered with a fresh heavy fibrous exudate which can be picked off and shows two or three fairly large areas of beginning gangrene. On the right side of the peritoneal cavity, corresponding to the denuded area left by the ascending colon, is a walled-off area of local peritonitis into which the drain projects. There is some pus in this region. Probably the infection had traveled down the drain from the broken down skin wound. There was no evidence of any compensatory process in the remaining portion of the intestine, for the removal of the segment of ileum and colon.

We could not account for the psychosis shown by the patient after the operation. It will be remembered that he behaved in

a similar fashion after his operation in San Francisco. On the whole, he suffered remarkably little discomfort in the first three days after the operation, considering the nature and magnitude of the procedure. Save for his restlessness and continued motion, he was in excellent condition until the vomiting spell after the administration of paraldehyde. It was undoubtedly at this time that the loop of ileum was incarcerated between the upper surface of the left lobe of the liver and diaphragm. This was indicated by the prompt change in his vital signs, although there was no complete obstruction, as was shown by a continuation of the diarrhœa. The distension in both upper quadrants the next morning is evidence that there was slight obstruction above the incarcerated loop.

Of special moment at this time is the fulminating diarrhœa which was inaugurated about fifty-two hours after the operation and continued with increasing severity until the patient died. The stools were fluid, small in quantity, foul smelling, but contained no blood. While in no way immediately responsible for the patient's death, the debilitating effect of the diarrhœa undoubtedly had an influence on his resistance and vitality. From the resection of the ileum or the colon alone no such violent reaction could have been anticipated. Indeed, in view of Monprofit's case, even the reaction to the combined resection seems excessive, although it must be remembered of Mayndl's case, where a less extensive resection of the colon was done, the patient died of inanition.

It may not be out of place here to recall Cannon's¹⁵ interesting work on the movements of the colon, in course of which he found that the waves up to a point about the beginning of the descending colon were predominatingly antiperistaltic, while in the remainder of the large intestine the peristalsis was directed towards the rectum. These results are confirmed by the observations made on human beings after the ingestion of bismuth meals by means of the X-rays. Under ordinary circumstances, the contents of the stomach are found in the cæcum about five or six hours after the meal is taken. Then

¹⁵ American Journal of the Medical Sciences, 1906.

they are found chiefly in the cæcum, ascending and transverse colon, until about twenty-three hours after the meal, when they are deposited in the rectum. It will be seen, then, that we removed not only 204cm. of the lower end of the ileum, but practically all of that portion of the colon where the intestinal contents remain longest.

In cases reported by the Mayos¹⁶ where similar segments of the colon have been removed no mention is made of a subsequent history of violent diarrhœa, and particularly Arbuthnot Lane's series of resection of the entire colon have shown, according to Lane,¹⁷ a violent post-operative vomiting as the single serious consequence of the operation. Harley's studies on the metabolism of dogs from which the large intestine had been removed reveal few disturbances of the equilibrium between intake and excretion except in an increase in the elimination of water. Fat absorption is unaffected, while the observation on the nitrogen elimination varies; in one animal it is increased and in another remains unaffected. Simple short-circuiting operations teach us nothing in respect to the conditions we are dealing with here, as the intestinal contents in these operations tend to follow the usual course which the food takes. Even an anastomosis of the ileum with the sigmoid, where a complete stenosis exists, might still allow the food delivered into the colon to be carried back into the cæcum by antiperistalsis.

Fantino, after the death of his patient from inanition due to the resection of 300cm. of ileum, drawing conclusions from another patient on whom, owing to error, he had created a sort of vicious circle while short-circuiting the entire colon and about 100cm. of ileum by reversing the anastomosis, suggests this as a regular procedure in cases of extensive resections of the intestine, because his patient stood the operation so well. He believes that, in this way, we might keep the intestinal contents long enough in the remaining segment of gut to allow the completion of the digestive processes.

¹⁶ Mayo: *Transactions of Am. Surgical Assn.*, Vol. 27, 1909.

¹⁷ Lane: "The Operative Treatment of Chronic Constipation," London, 1909.

In this series of forty cases there were seven deaths, giving a mortality of nearly 18 per cent. While all deaths from the resection occurred where 274cm. or more were removed, nevertheless 510, 520, and 540cm. have been successfully taken out. In a variety of pathological conditions involving the small intestine, it would appear that the removal of portions of the ileum measuring 275cm. is relatively safe. Schlatter's case, where only 192cm. were resected, Dreesman's, where the amount removed was only 215, and my own, gave much severer metabolic disturbances than the cases of Storp, Nigrisoli and Brenner, the maximum successful resections in the literature. It is, then, natural to seek the explanation of these differences partially in errors in measuring the length of the resected portion of the gut, but more probably in such accessory and important factors as the age, the condition of the patient, the total length of the intestine, and the effect of the pathological condition upon the patient's strength and resistance. Obviously, the result of the operation depends upon these features of the case as well as the length of the resected segment.

The clinical manifestation of the metabolic disturbances caused by an abbreviation of the intestine consist largely in a diarrhœa which, in the majority of instances reported, was only slight in degree, the patient ordinarily having two or three soft or fluid movements a day. These stools were often fatty in character, indicating the inability of the patient to absorb the fatty content of the food. In other cases, the disturbances were moderate in degree and, in still others, like the cases of Pauchet and myself, the diarrhœa was of a fulminating character. Another type of reaction to the removal of the gut was shown where the patients recovered from the operation, but suffered from such profound limitation of the power of absorption that they died later of inanition. The cases of Mayndl, von Eiselsberg, and Fantino were examples of this type, all of which lived about a month after the resection of the intestine.

MORPHOLOGICAL CHANGES FOLLOWING THE OPERATION.

In several cases. experimental investigations upon resection of the small intestine have been carried out during the past

fifteen years. The first of these were the researches of Senn,¹⁸ whose paper unfortunately was not available to me. He gives the limit of resection as 33 per cent. of the small intestine. To remove more than this amount is a dangerous operation that will result in marasmus and terminate sooner or later in death. Senn, according to the authors who have quoted him, also described a compensatory hypertrophy following the removal of the gut. Later, Trzebicky¹⁹ undertook to establish, by means of experiment on animals, the limit of resection of the small intestine. He removed in a series of dogs 25, 50, 75, 100, 150 and 200cm. of the combined jejunum and ileum. In one series, he removed the upper, in another, the middle, and in a third, the lower portion of the gut. Trzebicky judged the metabolic disturbances from the post-operative loss of weight in his animals. His results lead him to conclude that only 50 per cent. of the combined ileum and jejunum can be removed without serious metabolic disturbances and that the excision of 75 per cent. leads to such profound changes in the digestive apparatus that life is impossible. At the autopsies on his animals, he finds, when large percentages have been removed, a dilatation of the intestines and a disappearance of fat. A compensatory hypertrophy could not be found by this author. In applying his results to the human intestine, Trzebicky states that not more than 280cm. should be excised, as the total length of the combined ileum and jejunum in man is, according to his measurements, from 561 to 870cm. He found, furthermore, that the removal of the jejunal end of the intestine led to more profound losses in weight than when the lower end of the gut was resected.

Monari,²⁰ in 1896, by a series of operations on dogs, endeavored to establish the limits of resection in the gastrointestinal tract. He removed the entire stomach of a dog and found no interference with the metabolism. Then he took a

¹⁸ Senn: *Experimentelle Beiträge zur Darmchirurgie*. Basle, 1892. Quoted.

¹⁹ Trzebicky: *Archiv. für klinische Chirurgie*, Bd. 48, 1894.

²⁰ Monari: *Beiträge zur klin. Chir.*, Bd. 16, 1896.

series of five dogs from which he removed 186, 170, 249, 215 and 200cm. of the small intestine respectively. The operation, in spite of a rich diet, was followed by a period of denutrition, which was characterized by profuse diarrhœa followed by improvement and frequent relapses. The dogs from which 186 and 200cm. had been removed died within three months. The autopsy showed great loss of weight, atrophy of the muscles, absence of fat and anæmia. In the first dog there was 15cm. and in the second there were 12cm. of intestine, exclusive of the duodenum, remaining. The other three dogs lived eighteen months, but never regained the weight they lost after the operation. They had respectively 19, 16 and 20cm. of small intestine remaining.

From the microscopical examination of the specimens obtained from these dogs, Monari states that the mucous membrane was twice the thickness of the control animal. The villi were more numerous and larger, and the cylindrical epithelium with which they are clothed showed an increase in the number of goblet cells, which at the base of the villus are larger and more numerous than in the norm. The lymph follicles are enlarged and likewise the circular layer of muscle, while the longitudinal coat showed no change. De Filippi, whose results were published separately, studied the changed metabolism in the dog from which 190cm. of intestine had been removed and found no changes except in a diminished fat absorption. From his work Monari believes that 50 per cent. of the human intestine can be removed without the danger of metabolic disturbances.

A most interesting recent contribution to the study of extensive intestinal resection is afforded by the experiments of Evans and Brenizer,²¹ who resected 33, 37, 41, and 50 per cent. of the combined jejunum and ileum with recovery and the discovery of a more localized hypertrophy, particularly marked in the neighborhood of the anastomosis. The resections were followed by another series in which 76.1, 84.6, 86.5, 87.3, and

²¹ Evans and Brenizer: *Bulletin of the Johns Hopkins Hospital*, Vol. 18, 1907.

92.0 per cent. of the total mesenterial intestine was removed. The first two animals of the series recovered, while the last three died of inanition after living thirty, fifty-one and ninety-seven days respectively. The last animal of the series was very fat, which probably enabled him to live off his own tissues for the greater length of time. In the last animals, no hypertrophy was noted, these being cases where the resection had exceeded the limit where a compensation could be established. These authors conclude that an animal can practically always survive the removal of from one-third to one-half of the combined jejunum and ileum, but that resections greater than this may exceed the limit for which a compensation can be made.

In the autopsies upon our own animals, nothing was found of an abnormal nature outside of the intestine itself. Dogs No. 1, No. 2 and No. 10 were fairly well nourished, while Dog No. 9 was thin. The macroscopic changes in the intestines in Dogs No. 1, No. 2, and No. 10 were all practically alike. Careful measurements from the landmarks left at the time of operation showed that there had been no increase in the length of the intestine. Within the small limits of error that one might reasonably allow, the dimensions were the same. If any real lengthening had occurred, it was so slight that it could not be distinguished from a possible error in measurement. The intestines showed a marked increase in the transverse dimensions, which to the naked eye appeared to be about twice the size of the gut at the time of operation. This increase was confirmed as the intestine was taken from the body and compared with the piece that was removed at the operation. In all cases except Dog No. 9, in which the writer did not see the autopsy or control the preservation of the specimens, the hypertrophy varied between 30 and 100 per cent. It involved both the stomach and the cæcal end, although the relative difference in the size between these two portions of the intestine was preserved.

There is, however, apparently a limit beyond which a hypertrophic response can be obtained, where simply an intestinal incompetency is established and the dogs die of slow starvation,

prolonged and modified by the amount of food they can assimilate through the abbreviated gut. In such cases, the compensatory hypertrophy is absent, as Evans and Brenizer showed. In other cases, the response may be partial, but the dog may never gain its full weight and hence be only a partial recovery. Dog No. 12 is an example of this type. The hypertrophy was not nearly so marked as in the case of Dog No. 2, and the partial compensation is indicated in the functional inefficiency of the intestine as shown by Professor Underhill's metabolic determination in contradistinction to those obtained by Erlanger and Hewlett on Dog No. 2, under conditions of an average diet.

It was difficult to ascribe a cause to the transverse hypertrophy and the failure of the intestine to enlarge markedly in its longitudinal dimension. The only plausible interpretation appeared to lie in the mesentery. The mesentery, while providing for the normal elasticity of the gut, naturally holds the intestine somewhat fixed in its longitudinal dimension. This might be looked upon as the factor involved, although in such an elastic organ a slight lengthening of the gut may have been present and escaped observation, owing to the contraction of the longitudinal layer of the tunica muscularis. If this were the case, however, the increase could not have been in excess of 15-30cm., the usual possible error in measurement.

In Dog No. 12, where the small intestine was short-circuited, the differences between the two segments are beautifully shown (Fig. 1). The functional segment is seen markedly hypertrophied, while the short-circuited portion appears about one-half its size. The transverse folds, due to the contraction of the longitudinal muscle, are seen in both sections of the gut. In all of the other animals, no evidences of compensation or change was observed in the stomach or large intestine; both remained macroscopically normal. In the case of Dog No. 12, however, there is a marked dilatation of the stomach, with an almost complete atrophy of the omentum, but the large intestine appears normal. Sections of the stomach in these animals show that the parietal cells are considerably more prominent than the chief cells, the histological picture resembling not a

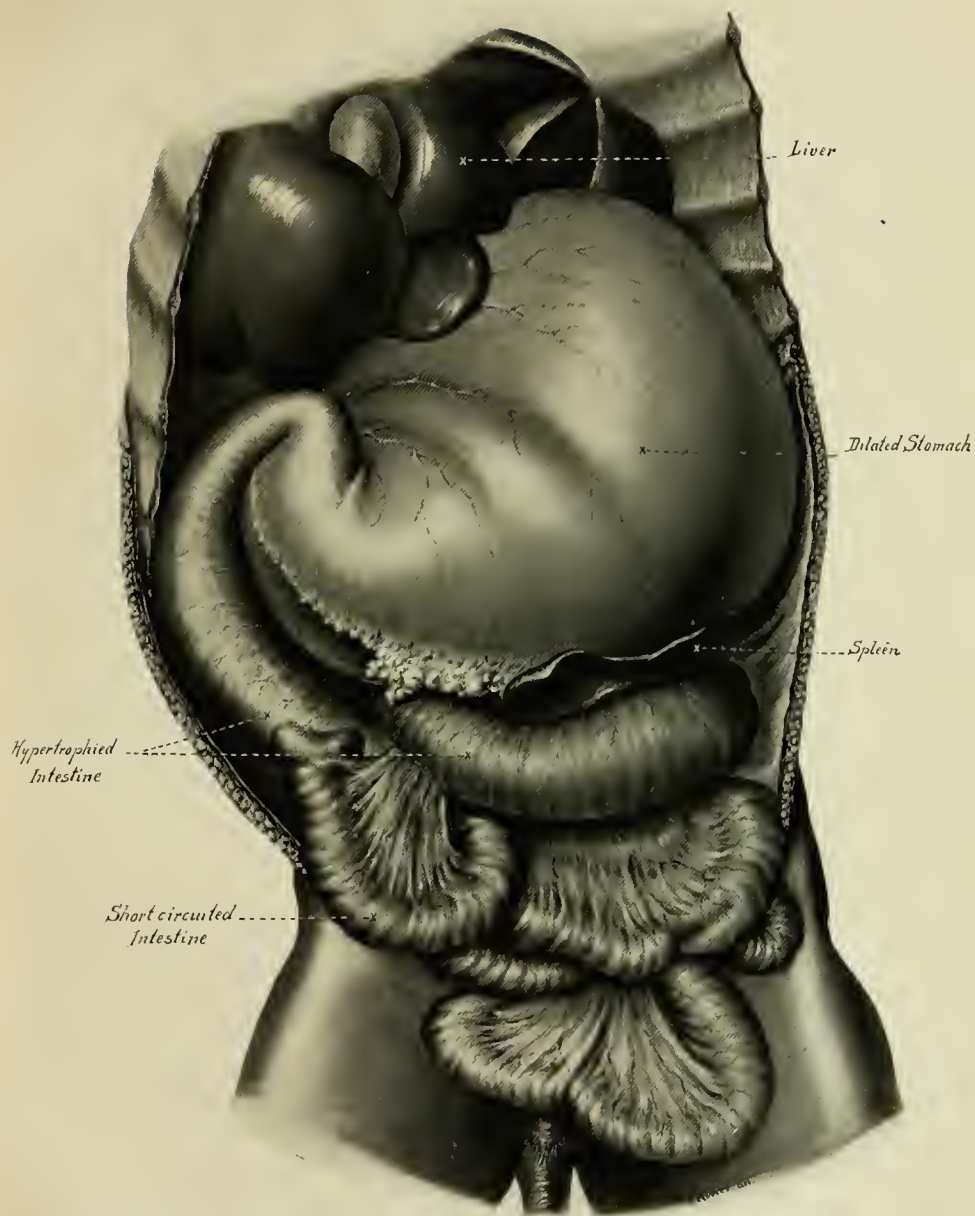


FIG. 1. Abdominal viscera of Dog No. 12, 214 days after operation. Total length of small intestine, 323 cm. Short-circuited, 237 cm. Functional, 86 cm. Functional resection of 73%.

little that given by Heidenhain for starving animals. No other changes were observed in the stomach. Microscopic examination of the colon in Dog No. 12 showed it to be of normal structure and thickness, making it evident that the colon has undergone no morphological changes to compensate for the functional removal of the small intestine.

It might be suggested that the difference in size between the two segments of the ileum in Dog 12 was partially due to an atrophy of the functionless portion of the gut, especially as Cunningham²² has described such changes after short-circuiting for physiological experiments. Plant,²³ who kept a dog alive two and a quarter years with a short-circuited loop which he had used for the study of fat absorption, found absolutely no evidences of atrophy. The sections of the short-circuited ileum of Dog No. 12 were the most perfect I have ever seen and showed absolutely no evidences of degeneration of any sort. Furthermore, the comparison of the size of the gut with that of normal dogs revealed no changes other than in the remarkable clearness of the histological picture. This I believe to be due to the absence of fats undergoing absorption which tend, when the intestine is thrown into the fixing fluids, to cause a separation of the epithelium from the stroma of the villus.

Monari states that there is a regeneration of the villi, that is to say, that they are more numerous after the operation than before. This appears to be a random statement, for only by the most accurate methods of observation could one say definitely that there was an increase in the number of villi. At the outset, I may say that I expected to find a regeneration of the villi, for, according to the manner of their development, it seemed like a simple method of providing for an increase in the epithelial surface of the intestine. In order to prove or disprove a regenerative process, I counted the villi and estimated the area of the intestine removed at operation and autopsy. The number of villi in a square mm. were counted

²² Cunningham: *Jour. of Phys.*, Vol. XXIII, 1899.

²³ Plant: *Am. Jour. of Phys.*, Vol. XXIII, 1909.

a great many times in each 10cm. of intestine and the average taken. From this, the number in each 10cm. of intestine were computed. Like the length of the intestine, the total number of villi varied in different animals. In the series of animals from which I computed the number of the villi, including not only our operated dogs but several normal ones as well, the total varied between 800,000 and 1,200,000. The number does not vary to any great extent between the upper and lower portions of the intestine, although the cæcal is much smaller than the stomach end of the gut. This indicates that the villi are smaller in this region, a fact which can be proved by a comparison of villi from the two sources in the same animal, or is demonstrated by sections of the healed suture in these extreme resections, where the upper end of the intestine is anastomosed to the lower. Here, where the two types are found on either side of the scar, on the duodenal side of the cicatrix they are about 50 per cent. larger than on the cæcal side, if there has been an extensive resection of the gut.

In comparing the portions of intestine removed at operation with those obtained at the autopsy, approximately the same number of villi were found in each 10cm. of intestine. In the same unit of area, however, only half as many were counted in the hypertrophied intestine as in the piece removed at operation. Inasmuch as there had been an increase in the total area of each 10cm. of nearly 100 per cent., the villi had naturally not increased in number, but had simply increased in size. In this way, it was possible to exclude positively at least any extensive regeneration of these structures which Monari believed took place. Although, as was shown later, the hypertrophic process involved the submucosa and muscularis as well as the mucosa, this was not apparent from a macroscopic inspection of the intestine. It gave the appearance, however, that the operation had yielded an intestine that was magnified about one diameter. This hypertrophy was more apparent in the upper than in the lower end of the gut. To determine the exact effect of the resections upon the intestine itself some accurate method must be employed. The com-

parison of sections by the eye must be supplemented by a mathematical registration of the differences in the intestine before and after the operation in three dimensions. Monari simply used a control dog and, in this way, could not exclude the possibility of individual variation between his control and his operated animals. Accordingly, to obtain the desired comparison and still to avoid all possible errors by the use of control animals, I reconstructed a portion of the intestine removed at the operation from the region of the upper suture in Dog No. 10. After the animal had lived a year and a half, another piece was reconstructed from the region just above the line of anastomosis where the upper and lower ends of severed intestine had been united. In this way pieces were obtained that were not separated from each other during life by more than 5cm. Observation shows that there are no differences in the structure of the intestine under these circumstances, although the intestine is smaller at the cæcal than at the stomach end and that the several coats are not so large or well developed in the distal portion of the gut. Any differences, therefore, between these two reconstructions must have been caused by the operation and the model made from the resected piece would represent the normal conditions for that region of the intestine. Such a model shows a number of facts interesting in themselves as well as being of importance for comparison, for it represents the normal anatomy of this portion of the intestine: but it should be remembered that the description applies only to the dog's intestine. A glance at Fig. 1 reveals the follow interesting facts. The normal villus can scarcely be looked upon as having a definite shape, as it is a more or less plastic element, influenced in its form by factors in its environment and in its architecture. The profile picture of a villus seen in sections, for example, gives no real conception of its form, as one must reconstruct many of them in three dimensions to appreciate the extreme variability of their contours in a fixed condition and to discover the factors that determine its shape under these conditions. Under perfectly relaxed conditions of the tunica muscularis, as well as the muscle bundles within the intestine

itself, the form of the villus would probably be columnar with rounded ends. As soon as the musculature of the intestine contracts, or when the intestine is thrown into the fixing fluid, the villus alters this form. This alteration, due to the contraction of the muscular wall of the intestine and the intrinsic musculature of the villus, does not represent an abnormal condition, but records permanently conditions that occur regularly in the intestine. The form of the villi has been variously described as cylindrical, fusiform, club-shaped, etc., but a glance at Fig. 2 shows that there are no constant shapes, as the form is largely an adaptation to external pressure and all of these types may be found in the same region. This pressure is exercised under normal conditions by a contraction of the muscular coats, which may, naturally, act in one direction or the other by the single action of either the outer or inner layer of the tunic separately, or in both directions at once by the simultaneous contraction of both sheets of muscle together. In such a specimen, the villi always fit into each other, leaving only a small space between their epithelial surfaces. Club-shaped, cylindrical, fusiform villi, and those with pointed ends occur side by side, closely packed together, taking on a form to fit the space they have to occupy. At times they are triangular in cross sections and may be folded or grooved to fit adjacent villi that impinge upon them. When one finds a villus with pointed ends, ordinarily there are club-shaped elements next to it. In general, the end toward the submucosa is smaller than the end toward the lumen of the intestine, a relationship, however, due to the contraction of the combined muscular coats. When the longitudinal muscle bundles within the villus contract, the epithelium on the surface of the villus is thrown into a series of transverse folds (Fig. 2). This illustrates excellently the pump action of the villus, which is a notable factor in aiding the movement of the intestinal lymph. By the contraction of the musculature in its stroma, the central lymph space of the villus is emptied into the submucosal plexus, where its return is prevented by the valves situated at that point. Villi in a state of contraction are shown by the folding of the surface epithelium.



FIG. 2. Reconstruction of a portion of the duodenal end of the intestine removed at operation from Dog No. 10.



FIG. 3. Reconstruction of a portion of the intestine from the same animal as figure 2. Taken from the region just above the healed intestinal suture. Before the operation, the pieces of tissue from which figures 2 and 3 were taken were separated from each other by not more than a few centimeters. Reconstruction made on the same scale as figure 2.

In many cases, the ends of the villi are rounded, while in others they are pointed and irregular. Likewise the sharp contraction of the intrinsic musculature of the villus as it is thrown into fixing fluids, often draws the stroma away from the epithelium and allows the latter to hang loose, like the finger of a partially withdrawn glove. By some investigators this has been considered a normal relationship, but it is obviously an artifact, as the stroma draws the membrana propria away with it and allows the epithelium to hang free and loose. Such free tips of epithelium are nicely shown in the model represented in Fig. 1. It may be well to observe, however, that such pictures are much more readily obtained during digestion, for the accumulation of the fat globules beneath the epithelium during absorption seems to facilitate the ease with which the stroma may be retracted from the epithelium. Instances where the stroma projects into the epithelial tips, however, are not abnormal. The average size of the villi in the same region of the intestine is constant, although their power of contractibility gives them under fixed conditions a slightly different caliber. Unfortunately, owing to the scale selected for the model, it was hardly possible to show the relationship of the crypts to the villi. They are represented by the solid portion of the model under the villi.

After the resection of large portions of the intestine, say from 50 per cent. to 70 per cent. of the entire small intestine, or from 60 per cent. to 83 per cent. of the combined ileum and jejunum, very marked changes take place in the structure of the remaining portion of the intestine. These modifications are shown in the model represented in Fig. 2, which was made from a portion of the intestine of the same dog as Fig. 1 and was not situated more than three or four centimeters from it before the resection of the intestine took place. Thus all of the differences shown by this preparation are the direct results of the operation. At the first glance, the enormous hypertrophy, which reaches about 100 per cent., is seen. Not only the villi are enlarged, but also the portion of the mucosa forming the crypts shows an increase in size approximately equal to that of

the villi. So far as the form of the villi are concerned, the relationships are practically the same. In the increase of the epithelial surface by the hypertrophic process, there seems to be a few more club-shaped villi, which may indicate a slightly greater increase in the mucosal as against the muscular coats of the gut, or may be due to a greater degree of contraction of the latter. In the hypertrophied specimen, great irregularity is observed in the form of the villi, but, as in the normal intes-



FIG. 4. Section of the intestine removed from Dog No. 2, taken from the stomach end of the resected portion in the first operation.

tine, this represents an adaptation on the part of the villus to the space which its neighbors allow it to occupy. There is, naturally, the same interaction of the individual villi upon each other's form. Numerous longitudinal folds occur in the villi near the base to allow them to fit in with the adjacent elements, and, where the longitudinal bundles of muscle in the villus are contracted, the epithelial surface is thrown into a series of transverse folds, giving it a corrugated appearance. In the hypertrophied specimen, this condition illustrates the pump-like

action of the villi even better than the contracted elements in the normal intestine.

The microscopical changes that take place in the intestine after the resections may be seen in the two figures drawn from sections of the gut before and after the operation. Fig 4 is taken from the upper end of the resected portion of the intestine removed at the first operation, while Fig. 5 is from the portion of the ileum just above the first suture; that is to say, the tissue from which the sections were cut, like that from which the reconstructions were made, was situated in the same segment of the gut before the operation was undertaken.

The hypertrophic process induced by the resections involves all the layers of the intestine, but it is more patent in the tunica mucosa, than in either the submucosa or muscularis. In the mucosa, the hypertrophy occurs in the region of the crypts as well as in the villi. The latter show an increase in the amount of their stroma, although it maintains the same characteristics as the stroma of the normal villus. The reticulum framework is a little denser and its nuclei are more numerous, otherwise the connective tissue is unchanged. The longitudinal bundles of smooth muscle are proportionately enlarged and the vessels appear more tortuous. On comparing the epithelium of the hypertrophied villus with the control specimen, it is observed to be distinctly higher than normal, the hypertrophy reaching, perhaps, 30 to 50 per cent. in excess of the cell's original size. The nucleus also takes part in this process with a slight increase in size, but otherwise, the cell retains all of its usual characters, such as the granular protoplasm and the cuticulated border toward the lumen of the intestine. Goblet cells are numerous about the base and sides of the villus as in the control specimen, but there is no increase relatively in the number of these cells such as Monari described, although with the enlarged epithelial surface there is a numerical excess over the control specimen. No mitotic figures are seen in the epithelium covering the villus.

It is not possible to make out great changes in the stroma of the region of the crypts, but like the epithelium of the

villus, these elements themselves are both hypertrophic and hyperplastic. The chief increase is in the length of the crypts and in the presence of occasional cryptic dilatations at their extremities. These ampullæ-like widenings rarely exceed four or five times the diameter of the crypts and ordinarily show little evidence of pressure or pressure atrophy, although in one or two instances I have observed points where epithelium was flattened to a third of its normal height. These cysts are filled with a coagulated granular mass and desquamated degenerating cells. The proportion of goblet cells has not increased. In the lower half of the crypts there are numerous karyokinetic figures, probably representing the regular regeneration of the epithelium of the villi and the crypts, according to the observations of Bizzozero and Heidenhain.

In Dog No. 1, however, the karyokinetic figures are much more numerous than in the other three cases. This may, of course, represent only a very active regeneration, but it seems quite possible that it is associated partly with the hypertrophic process, for, in this case, I have also found occasional mitotic figures in the stroma of the villus. This dog was killed before the total compensatory increase in the epithelial surface was established, and thus the excess of karyokinetic figures over those that are present in Dogs No. 2 and No. 10 can be explained. It is extremely difficult to form an opinion concerning the changes in the stratum fibrosum and the stratum granulosum, for they vary to such a marked extent with the degree of distension of the gut, but it is probable that, in common with the submucosa, these layers are somewhat enlarged.

The muscle tunics have distinctly hypertrophied, but of the two, the inner circular layer is larger when compared with the control specimen. This is in accord with Monari's observations. The Peyer's patches have also taken part in the general enlargement, and in Dog 1 evidences of cell division are occasionally found. The enlargement of these structures are by no means proportional to the hypertrophy of the

mucosa, however, in my specimens, but owing to the impossibility of distending both portions under exactly the same pressure, this point is of no moment, as the comparison cannot be made absolute.

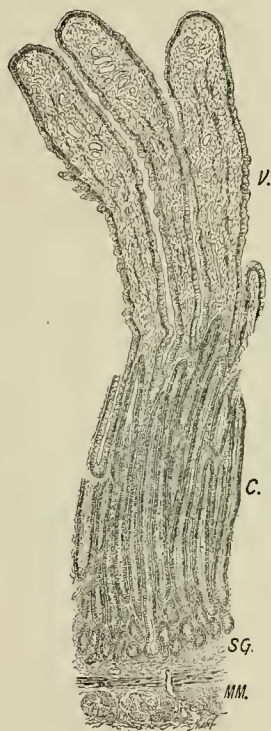


FIG. 5. Section of the mucosa taken from the duodenal side of the upper suture in Dog No. 2; that is to say, from the same region of the intact intestine as the section shown in figure 4.

After the consideration of the morphological and metabolic changes resulting from a shortening of small intestine, it is now possible to consider these modifications of structure and function in their relations to each other.

In trying to determine the cause of the hypertrophic process that occurs after the extirpation of a large portion of the gut.

there are a number of factors to be taken into consideration. In the first place, there is no question that more mechanical work is done by the portion that is left. The simple mechanical effect, however, of the increased amount of food and water taken, as evidenced by the ravenous appetite and great thirst displayed by the animals after the operation, seems inadequate to explain the change, for these, like the normal appetites, are more probably simply symptoms of a tissue thirst and a tissue hunger induced by the reduction of the normal absorption of food stuffs. If the term "work" is used in the sense of an increased functional activity, then, to be really explanatory of the hypertrophic process, it must be analyzed into its several factors.

As was shown by the investigations of Diliberti-Herbin, the immediate metabolic effect of the operation is to diminish, to a marked degree, the absorption of fats and nitrogenous substances. According to Vitali's observations there is, in all probability, also an initial decrease in the absorption of carbohydrates, whereas after the compensation is fully established by the hypertrophic process, these food stuffs are completely utilized. This diminished absorption or increased excretion with its consequent destruction of the normal balance between ingestion and elimination makes it essential, if the nutrition of the animal is to be maintained, either for the remaining portion of the intestinal mucosa to improve in the efficiency of its power of absorption, or else to proliferate and increase its area as a compensation for the lost portion of the gut.

As we have seen, the second process takes place and we may say then, that the diminished absorption of fats, nitrogenous substances, and carbohydrates causes a proliferation of the intestinal mucosa and at the same time to the other coats of the intestine. As time passes, there is a gradual decrease in the excretion of these substances (Diliberti-Herbin) and with it goes hand in hand an increase in the absorbing surface of the intestine, as is shown by the findings in Dogs No. 1, No. 2, and No. 10. The metabolic disturbances may, under favorable conditions of diet and life, finally disappear and the

nutrition become practically normal (Erlanger and Hewlett, Dogs No. 2 and No. 10). When this condition is attained, we find that the mucosa in a dog with 70 per cent. of the small intestine removed (Dog No. 10) has hypertrophied to the degree shown in Fig 3.

This ratio between area of absorption and the degree of elimination proves positively that there is a relation between the area of the intestine and the nutrition of the animal. We may even go as far as to say that, under normal circumstances and average conditions of diet, there must be a minimal relation between the area of the intestine and the size of the organism.

The intestine, like other organs, probably rarely functions up to the limit of its capacity. Like the heart and other organs, there is a reserve power rarely called into use. This excess in the intestine may, perhaps, be measured by the resection of small portions, where the metabolic reaction is nil or is buried in the normal variations. But when the limit of this reserve is reached, the diminished absorption involves the adaptative powers of the remainder of the intestine and a compensation for the loss is established in a hypertrophy of the remainder. In this case, the parallel between the hypertrophy of the heart and the hypertrophy of the intestine is perfect, although the functions and factors involved may be entirely different. Moreover, the comparison may be carried still further, for the adaptation, as in the heart, although admirably calculated to compensate for the loss, lacks the efficiency of the normal organ. Like a machine run to its full capacity, it is liable to break down. This was admirably shown in the case of Dogs No. 2, No. 9 and No. 10, where under favorable conditions of diet and life, the hypertrophy secured a functional adjustment like that of a normal dog. As soon as these favorable conditions ceased to obtain, the insufficiency of the adaptation became evident and nitrogen and fat were eliminated in a much higher percentage than in a normal animal. If the adjustment is too fine, as in Dog No. 9, the break leads to death, like a broken compensation of the

heart, or to some such condition as the prolapsus recti, induced in Dog No. 10 by the profuse diarrhœa.

The history of the operations on the human intestine parallel in all respects the experiments upon our animals. Schlatter's case particularly, with the diminished absorption which persisted for almost two years, reached finally such a stage of compensation that his patient, an Italian, could eat the frugal diet of his people. In this case there is little question that the hypertrophic process was slowly taking place.

A last and most interesting point in connection with the functional adjustment produced by this hypertrophy lies in the relationship of the epithelial or absorbing surface of the intestine before and after the adaptation has taken place. In Dog No. 10, from which the reconstructions were made, the hypertrophy of both villi and crypts led to an increase of almost twice their original size. In this case 238cm. of the intestine was resected and the portion remaining, as shown at autopsy, was 96cm., making a total length of 334cm. In such more or less cylindrical structures as the villi and crypts an increase of 100 per cent. in their size would lead to an increase of 400 per cent. in surface. That is to say, the surface of the enlarged villus or crypt would be four times that of the original element.

Bearing this fact in mind, I have endeavored to compute the degree to which the compensatory hypertrophy restores the original epithelial surface of the intestine. A computation of this character, naturally, cannot be made more than generally accurate, but the figures indicate that the compensatory enlargement of the crypts and villi, when the process is complete, approximately restores the original surface of the intestine. That a hypertrophic mucosa, even should it have the area of a normal intestine, is not as efficient an agent for the absorption of the essential part of the digestive processes which are carried on in the intestine, is shown by the ease with which it becomes incompetent to do its work—a fact to which attention has been called above, in Dogs No. 2, No. 9 and No. 12.

It was noted in discussing the autopsy findings that the stomach and colon play no demonstrable part in the compensatory process. Barring the conditions in Dog No. 12, where the stomach was markedly dilated, no changes of note occurred in these organs. Thus, there is a pretty definite basis for the view that the different portions of the alimentary tract exercise a fairly specific function, and while, as has been shown, an animal or a man may live without either stomach or colon, a certain amount of small intestine is necessary for the maintenance of life. Indeed, after the efforts at regeneration which the organism makes to restore lost parts of the intestine, it is probable that there is a definite ratio between the size of the organism and the epithelial surface of the intestine under ordinary conditions of diet and life.

This is made even more probable by the interesting experiments of Babák,²⁴ who tested the question on frogs. Frog larvæ may be brought up either as herbivora or carnivora. Babák divided a large series of larvæ, feeding one group with a vegetable and another with a meat diet. The groups raised as herbivora invariably had larger intestines than those fed on meat. This indicates the influence of the diet on the size of the intestine, but might equally well be used to express the demands which the organism makes for a certain absorption surface, which may be demonstrated either by reducing that which it possesses or changing the nature of its diet to one less easily assimilated. Pauchet states in his paper that he intended to bring about a lengthening of the intestine of his patient by feeding a vegetarian diet. If, however, this idea were carried out without judgment, it might be made equivalent to a more complete resection of the intestine.

So far as the practical bearing of the researches upon animals with shortened intestines are concerned, the results do not justify us in establishing a limit of resection which may be definitely applied to the human intestine. Even the series of cases of extensive resection of the human ileum set no definite boundary which it is fatal to exceed, as the maximum

²⁴ Babák: *Arch. f. Entwicklungsmechanik*, Bd. 21, 1906.

measured instance in the literature, a case of 540cm., was not only successful, but caused astonishingly little metabolic disturbance. From the experimental standpoint, this limit will not be established until the method of fractional resection is thoroughly applied, as the interesting work of von Haberer on the kidney shows. At present, even the results of primary resection are colored too much by such factors as the age and condition of the animal or patient, the length of the intestine and the functional efficiency of the mucosa. As a matter of fact, notwithstanding the effort of numerous investigators to establish this limit, its interest is only academic and its application will only be of use in affording us, perhaps, indications as to diet and a probable prognosis of the case. These facts are shown by an inspection of the table of cases given above when more than 200cm. of the intestine was resected. In these instances, the procedure was never an operation of choice, as the extent of the resection was established by the pathological process and not by the surgeon. The surgical rule has been and will continue to be, the removal of the minimum amount of the gut permitted by the morbid condition, and the prognosis will depend chiefly upon the factors given above; namely age, condition, resistance, nutritive efficiency and the length of the unresected segment of the gut. To these factors might be added, as Fantino has pointed out, the ability of the remaining part of the intestine to inaugurate compensatory processes. There are, apparently, instances when portions of the intestines are functionally incapacitated some time before the necessity of an operation, a condition which would bring the case to the operating table with a partially compensated or hypertrophied intestine, and thus facilitate the subsequent compensation for the resected segment of the gut. Such a state of affairs would almost be equivalent to a fractional resection, where the hypertrophic process would be partially established before the limit of resection is reached.

Generalizations from our animal experiments might lead us to assume that 50 per cent. of the human intestine might be

removed, perhaps with severe nutritive disturbances, but with no probability of death. A study of the cases, however, shows the possibility of death from inanition where only 300cm. have been resected. Mayndl's case, which died of marasmus after the removal of 284cm., was possibly complicated by the cachexia caused by the carcinoma cæci which necessitated the resection. If we are justified in generalizing from these cases, we may say that there is not great danger in removing as much as 275cm. of the small intestine, but that beyond that limit death from marasmus may occur. As a result of the operation, there is the possibility of severe nutritive disturbances after the resection of so small an amount as 198cm., as is evidenced by the case of Schlatter. On the other hand, the resection of much larger amounts may yield relatively little interference with the metabolism, as is shown by Brenner's case, from which he removed 540cm.

The metabolic experiments indicate that the diet in these cases should be rich and easily assimilated, but it should not contain too great a percentage of fats. The complete utilization of the carbohydrates of the diet suggests the advisability of increasing these elements of the food, especially in some easily assimilated and usable form.

CONCLUSION.

1. As much as 50 per cent. of the total small intestine in dogs may be removed without fatal results. The animals may gradually return to a condition of practically normal weight and metabolism when maintained on the favorable diet under good conditions. Resections of 75 per cent. and even more of the total small intestine may be survived, but such animals are not liable to show a true recovery; i. e., a return to normal weight with the establishment of a good compensatory process.

2. At first, the animals suffer from a severe diarrhœa, ravenous thirst and appetite, and loss of weight, from which they gradually recover until conditions may return to those of a normal animal. They remain, however, extremely sensitive to unfavorable conditions of diet and living.

3. Metabolic studies on such animals show that there is a marked increase in the excretion of the nitrogenous, fatty, and carbohydrate elements of the food. The elimination may reach 66 per cent. of the diet content. After compensation is established, on a rich, easily assimilated diet, digestion goes on as in a normal dog, except for an increase in the amount of intestinal putrefaction, as indicated by the amount of indican in the urine. An increase in the amount of fats in the food may lead to an increased elimination of nitrogen and fats to a point about 25 per cent. above normal. The carbohydrates, on the contrary, are absorbed to a degree considerably above normal after the compensation is established.

4. The compensatory process consists in a hypertrophy as well as hyperplasia of the remaining portion of the small intestine. There is no regeneration of either the villi or crypts. Computation makes it probable that in favorable cases approximately the original epithelial area of the intestine is restored by the hypertrophic process. There is apparently no adaptation on the part of either the stomach or colon to take over the function of the small intestine, although, in one case only, there was a marked dilatation of the stomach. The remaining organs are normal microscopically and macroscopically.

5. There are forty cases reported in the literature where over 200cm. of the small intestine have been resected. The mortality is 18 per cent., which is probably much lower than it should be, owing to the greater probability of successful cases finding their way into the literature. Human cases behave in general like the animals. They show similar metabolic disturbances. In one case, there was distinct evidence of a compensatory process. No regeneration or hypertrophy has ever been reported in a human case.

6. The metabolic disturbances in human cases bear no definite relationship to the amount of small intestine resected. Five resections over 400cm. have recovered, while death from inanition has resulted from the resection of 284, 300, and 350cm., respectively. Profound digestive disturbances have resulted from the removal of 192 and 204cm. of ileum. In

human cases, factors like difficulties in measurement, the pathological condition, the total length of the intestine, and the resistance of the patient undoubtedly modify the result.

7. Resection of the human intestine is almost never an operation of choice. The surgical rule has been, and will continue to be, a resection of the minimum amount allowed by the pathological conditions. From the metabolic studies, it would seem wise to give these patients a rich and easily assimilated diet, poor in fats and relatively rich in carbohydrates.

DISCUSSION

DR. YANDELL HENDERSON (New Haven): These investigations are certainly the most extensive and the most precise that have been carried out in this field. I cannot attempt, in the time allotted, to comment on them in general, and shall confine myself to the subject of functional compensation.

How may we suppose that this arose, and in what did it consist in the cases in which the dogs retained their normal condition after the removal of two-thirds of the intestine? It is a well-founded belief in physiology that the absorption of carbohydrates and proteids is confined almost wholly to the small intestines; that water is absorbed in the large intestine; and that it is not easy for one portion of the intestines to take over the functions of another part. Dr. Flint's findings seem to support this. It is ultimately a chemical adjustment, doubtless, but it seems to me that it is initially a mechanical adjustment. Attention needs to be paid to the functional behavior of the ileocecal valve. We know less about this valve than about any other portion of the alimentary canal. We know a good deal, however, about the behavior of the pylorus, of the anus, and of the cardiac sphincter. If we apply to the ileocecal valve what we know about other portions of the alimentary tract, we can get some light upon the subject.

We know that there is a precise adjustment of reaction to stimulation, so that the alimentary canal tends to retard material not fit to go further. Cannon has shown that what opens the pylorus is the presence of acid material above it, and that what closes it again is the presence of acid material below it. We may suppose that the ileocecal valve behaves in somewhat the same manner, so that when there is food of a consistency unfit to pass into the large intestine above this valve, it automatically remains shut until this food has become of the proper consistency. Otherwise, it opens.

If this mechanism continues to act in this way, we have an explanation of why we do not have a change in the large intestine after

removal of a large part of the small intestine, but do find great changes in the remaining portion of the small intestine. I offer this only as a probable explanation of what seems to me to be one of the most striking characteristics. Dr. Flint's paper answers certain points clearly, but like all good work it raises many new questions.

DR. LAFAYETTE B. MENDEL (New Haven): Professor Flint's researches afford an indirect, yet none the less instructive, confirmation of certain conclusions with respect to the functions of the alimentary tract which are being accepted almost without dissent by physiologists at the present time. One of these involves the practically complete lack of the power of absorption on the part of the stomach. If this organ took, or were capable of taking, any noteworthy part in the processes of absorption of food products, one might expect the stomach to compensate the inadequacy of the intestinal functions in such cases as have just been reported. The fact that this apparently does not occur lends emphasis to the view that the stomach is primarily, so to speak, a "preparatory" organ. Another deduction similarly follows and is especially brought out by the comparatively poor utilization of foodstuffs in dogs with shortened intestines, namely, the insufficiency of the large intestine (unimpaired as it was in these cases) for any extensive work of digestion and food absorption.

A consideration of this feature in its practical bearings at once raises the question respecting the utility of rectal alimentation as it is currently practiced. If the large intestine is incompetent to assist in the nutritive functions under the otherwise favorable conditions which prevailed in Professor Flint's animals, can any considerable utilization of food products be expected when nutrient enemata of milk and egg and similar substances are administered to patients? These observations confirm the skepticism which various studies, especially those of Edsall in this country, have aroused regarding the real value of rectal feeding as it has been carried out by clinicians. Gain in weight may be an illusory indication associated with absorption of water alone. The recent work of London on polyfistula dogs and of Röhmman on intestinal absorption likewise emphasize the preëminent importance of the small intestine in the chemical and physico-chemical aspects of the alimentary functions. The paper presented to-day leads to the viewpoint that neither stomach nor large intestine are in any broad sense compensatory organs for the small intestine; and therapeutic practice must bear this in mind.

A few years ago it was less easy to appreciate the significance of this *specialization of function* along the alimentary tract. Physiological research has shown that the chemical changes involved in digestion

are far more profound than was formerly supposed to be the case—that proteins and fats and carbohydrates are actually split extensively prior to their assimilation. The chemical agencies by which this is accomplished are centered in the small intestine, where in addition to bile and pancreatic juice, the long-neglected intestinal secretion furnishes its quota of enzymes (erepsin, lipase, invertases). Here, furthermore, special excitants for secretion are manufactured. The lesson of the research lies in the emphasis which it places upon the localized specialization of function along the digestive tract.

DR. RICHARD F. RAND (New Haven): May I just add a word to Professor Mendel's statement regarding rectal alimentation? In speaking with me concerning the subject some time ago, he recommended the rectal feeding of a patient with dextrose solution. That saline and dextrose solutions are absorbed is acknowledged by physiologists.

Some Practical Points in the Administration of Anesthetics.

RICHARD F. RAND, M.D., NEW HAVEN, CONN.

Anesthesia antedates antiseptis, yet the development of the practical administration of anesthetics has not reached the general degree of perfection that antiseptis and its outgrowth, asepsis, have attained.

Local anesthesia holds an important place in surgery and in some clinics has a wide range of usefulness. Our oldest anesthetic, nitrous oxide administered with oxygen, is at present being used with considerable success for major operations. Ethyl chlorid also has its place.

In spite of the possibilities of these newer methods, our main reliance is still on ether and chloroform and, in this section of the country, at least, ether is the general choice.

Quite apart from the controversy over the relative merits of the open or closed methods of administering ether, is the question of anesthesia in the hands of the occasional anesthetist and in hospital practice. To the hospital interne his period as anesthetist is often irksome and he is glad when he has finished it. To the hospital the frequent breaking in of a green anesthetist means constantly recurring periods of good, indifferent, and bad anesthesia. Considerations of economy in the use of ether, the safety and comfort of the patient and the assurance of satisfactory anesthesia for the operator have led many hospitals to appoint permanent professional anesthetists.

It is a matter for reflection that many of these anesthetists have devised complicated forms of apparatus, varying somewhat in detail but having for their object the supplying of ether vapor to the patient in varying graded percentages. The importance of this regulation of percentages would appear

more evident, perhaps, if it were possible to maintain an air-tight connection between patient and apparatus.

The cumbersome and expensive inhalers of Hewitt, Bennett, Gwathmey, and others require special training and experience for their successful use and are essentially adapted for hospital practice. The general practitioner and the occasional anesthetist require a simple, easily portable, and cheap outfit.

The brilliant record of Alice Magaw, over 14,000 consecutive anesthetics by the drop method without a death, has stimulated a widespread interest in this method of administering ether. The method has several points in its favor; the apparatus needed is simple, cheap, easy to use and carry, and can be effectually sterilized for each case.

After an experience with the drop method with nearly 300 cases, I have come to prefer it to the cone, or the Bennett inhaler, the two other methods with which I have had experience. And I feel that the drop method has so many points in its favor that it is the one best adapted for general use. Magaw uses a mask, of the shape of the ordinary Esmarch chloroform mask but slightly larger. This is covered with two layers of stockinet, supplemented by several layers of gauze when it is necessary to give more concentrated ether vapor. After experimenting with various masks, I have found the Ferguson type easier to use and rather more economical of ether than the plain open mask.

While the patient is going under the influence of ether it is necessary to give a concentrated vapor, and to this end he should not be allowed to get any air under the edge of the mask. A dry, folded towel turned about the face and lower part of the mask is a great help in shutting off this air inlet.

For a dropping bottle we may use the ether can itself, either by punching a pin-point hole in the soft metal cap and controlling the flow with the finger, or by cutting two grooves in the cork and inserting a bit of gauze in one of them. A chloroform dropping bottle with the delivery tube partially choked by a piece of wire makes a better dropping bottle.

The four classical stages of anesthesia are briefly: the stage of consciousness, the stage of excitement, the stage of surgical anesthesia, and the stage of overdose. The skillful anesthetist endeavors, and frequently is able, to reduce the second stage to the narrowest limits and to avoid altogether the fourth. It has been my custom in talks to students, in order to impress more strongly on their minds the importance of care in the administration of anesthetics, to divide the period of anesthesia into two stages. First, the stage of apprehension for the patient; and second, the stage of apprehension for the anesthetist. The first corresponding to the period of consciousness of the patient and the second to the period of consciousness of the anesthetist.

It is a trite saying that the anesthetist should endeavor to gain the confidence of the patient. The manner of approach is important, for the patient is usually awaiting the anesthetic with dread. That time-honored formula: "Don't be afraid, just take a deep breath, and you'll be all right," does not seem calculated fitly to dispel the dread. After it one rather expects to see the patient coughing and choking under a tightly applied cone drenched with ether. Avoid, then, spoiling the effect of your kind words of assurance by the act of suffocating your patient with a strong dose of ether at the start. Magaw talks her patient to sleep while cautiously and slowly giving him ether during the first stage. The patient should be told to breathe quietly and naturally, to keep his eyes closed, and to be as quiet and passive as possible. I would urge every one before he gives an anesthetic to try it on himself and thus learn at first hand how pleasant and how unpleasant the first few whiffs of ether may be.

Operations are best done in the morning, in order that the patient may at least have had a partial rest. Whenever possible, and this is nearly always, the anesthetic should be started on the operating table. Anesthetizing the patient in his bed means a longer anesthesia, and means an interruption and disturbance of the orderly course of the anesthesia consequent on carrying the patient from bed to table, and this at a time

in the anesthesia when it is important to have no interruption. The patient should get comfortably settled on the table and then be allowed to breathe air alone through the mask for a few minutes. As soon as he is accustomed to breathing through the mask, a single drop of ether should be allowed to fall on the gauze. Drop by drop, very slowly at first, and then more and more rapidly, add ether as the patient becomes more accustomed to breathing it. Always avoid giving so much that the patient will choke, or cough, or hold his breath. During the administration of ether there is usually a marked increase in the flow of saliva. A hypodermic of morphin and atropin about thirty minutes before starting the ether is of great help in allaying the patient's nervousness and in checking an excessive flow of saliva.

It is my practice to turn the patient's head well to one side so that the saliva will gravitate to the lower cheek instead of to the pharynx. This position of the head is also of help in the control of the tongue, as will be explained later. When the patient is unconscious, or even sooner, a piece of gauze is placed in each cheek, between the cheek and the upper teeth; this serves to absorb the secretion from the parotid glands, and the piece in the lower cheek will absorb that from the submaxillary and sublingual glands as well. These pieces as often as saturated are replaced with fresh gauze. One should endeavor to keep the concentration of the ether vapor just short of the point of causing coughing or embarrassment of breathing during the first and second stages of the anesthesia. The drop method permits of this regulation to a nicety. The second stage can be shortened markedly by giving the patient as strong ether as he can breathe comfortably. In this connection it should be remembered that it is not the amount of ether poured on the mask or into the cone which counts, but the amount of ether vapor available for the patient to breathe. The boiling point of ether is 98 degrees Fahrenheit. The vaporization of ether is helped by warming it. This is readily done by placing the unopened cans in a dish of warm water at a temperature a little below the boiling point of ether.

In the third stage of anesthesia, which is the time for the actual operating to be done, the patient's muscles are entirely relaxed, the pupils are moderately dilated and react to light, the skin is warm and of good color, the pulse slows down somewhat and is of good quality, and the respirations are regular, slow, moderately deep, and somewhat noisy. The character of the respiration is the best single sign we have of the depth of the anesthesia. In a fair percentage of cases, a peculiar rhythm occurs in the breathing: about once in every six to ten inspirations there comes a single distinctly deeper and longer inspiration. This recurs with striking regularity when once established, and has been found to indicate that the patient is rather lightly anesthetized, though completely relaxed. It is a good plan to regard this as a call for a little more ether, for if we do not give more, we soon find that the patient is beginning to come out.

As the patient passes into the third stage of anesthesia, with the relaxation of the general muscles of the body there is a corresponding relaxation of the muscles of the tongue and the latter falls back against the posterior wall of the pharynx, frequently causing a marked obstruction to breathing. Holding the lower jaw forward will usually lift the tongue forward and permit of free breathing. Many patients can be held, "gimbal-jawed," with ease by light pressure under the chin, after first hooking the lower teeth forward over the upper teeth. In others the jaw can be held up only by firm pressure back of the angle of the jaw on one or both sides. Others breathe well only when the jaws are separated and at the same time the lower jaw is held forward. I have found a cork cut with a mushroom head, placed in a piece of gauze and inserted between the teeth, of assistance in holding the jaw forward in these latter cases. In patients who have lost their teeth, simple holding up the jaw does not suffice; indeed, frequently makes matters worse. The cheeks and lips fall together and prevent air entering through the mouth. A piece of roller bandage one inch in diameter inserted between the toothless jaws and allowed to project from the corner of the mouth will

serve to keep the jaws and lips apart and allow a free passage for air. A large tracheotomy tube has been used in the same way with good results.

A routine use of tongue forceps and mouth gag is to be deprecated. There are cases, however, in which tongue traction is a necessity and a Carmalt tongue forceps or a thread through the tongue are perhaps the best devices. When the tongue falls back against the pharynx, it is held there by suction and tenacious mucus. In such a case grasp the tip of the tongue by thumb and fingers, using a piece of gauze to prevent slipping, and gently draw the tongue forward until it is free from the posterior wall of the pharynx. If the jaw is now held forward, and especially if the head is turned well to one side, the tongue will not fall back and the necessity for tongue forceps is obviated. The position of the patient's head, either a little higher or a little lower, often has a marked influence on the ease of breathing. Fat people with heavy shoulders and lean people with stoop shoulders or angular necks nearly always breathe better with a pillow under the head. Attention to these apparently trivial details frequently means the difference between a comfortable anesthesia and a difficult one.

If there is a doubt at any time as to the depth of the anesthesia after the third stage has been established, it is always well to be safe and to assume that the patient is too deep. If we allow him to breathe air for a few minutes, we can readily control him at the first sign of his coming out.

Vomiting should occur only after the operation is ended. Vomiting during the first or second stage is due either to insufficient preparation of the patient, *i.e.*, allowing him to come to the operating table with food or liquids in his stomach, or to a delayed or prolonged second stage, or to the patient coming out partly from the anesthetic after he has been fairly under its influence. All of these are preventable. During the course of a long operation the patient is kept very lightly under, just on edge as it were. At such a time he may suddenly start to vomit. With a patient going along smoothly,

the first warning of impending vomiting is a slight spasmodic contraction of the diaphragm. This should be heeded at once. If the patient is given more ether promptly vomiting can be prevented. If, however, vomiting has begun and vomitus is actually in the mouth or pharynx, it is worse than useless to attempt to give more ether. The patient must be allowed to come out sufficiently to empty his stomach while the anesthetist clears out the patient's mouth and throat. When quiet has been restored, the anesthesia is continued.

The prevention of post-operating vomiting in all cases is yet to be attained. In a series of cases, the more experienced anesthetist will have fewer cases of vomiting. In line with this, the cases that have taken their ether well will have the least amount of vomiting. Patients who have secreted a large amount of saliva, especially if this ether-laden saliva has been swallowed, are more likely to vomit. As the patient comes out of ether, we expect him to vomit once or twice; if this is all, it is considered a good recovery. Abdominal cases, especially cases with peritonitis, are particularly subject to post-operative vomiting, much more so than after equally long operations in which the abdomen is not opened. Breast cases, even after operations of several hours' duration, seldom are troubled by severe vomiting. Under the same conditions as to length and depth of anesthesia and character of operation, patients vomit as much after chloroform as after ether.

Stomach washing is helpful in cases of peritonitis or obstruction that have vomited for hours before coming to operation, but its value as a routine procedure is questionable. The washing should be done while the patient is still quiet under the anesthetic.

Oxygen inhalations while the patient is coming out and afterwards has its advocates.

We can refer but briefly to the question of the choice of anesthetic. Magaw states that cases of pulmonary tuberculosis take ether well and that cases of chronic bronchitis often are better after anesthesia. In surgery of the brain, the operator usually prefers chloroform. The now recognized late

effects of chloroform on the parenchymatous tissues make it seem that ether rather than chloroform should be the choice in cases of nephritis, diabetes, etc.

A word in regard to anesthesia at night in a room lighted by gas or oil. Both ether and chloroform vapors are decomposed by the naked flame; the former is decomposed into an aldehyde and the latter into free chlorine principally. Both of these are very irritating to the respiratory mucous membranes and soon render a room uninhabitable. Chloroform vapor diffuses throughout the room and no placing of lights can prevent the liberation of chlorine. Towels or sheets wet with weak ammonia solution will neutralize a part of the chlorine if hung near the lights. Ether vapor, however, is dense and heavy and falls to the floor, so that, although its vapor is explosive, there is no danger of explosion and very little formation of aldehyde if the lights are well above the patient's head.

DISCUSSION.

DR. ORIN R. WITTER (Hartford): I feel that one of the great advances in surgery within the last few years is in the manner of giving anesthetics, so that now many surgical risks can be taken which previously could not. This has been brought about, to a very large extent, by the methods described by Dr. Rand. I consider that the preparation of the patient should be both physical and mental. Physically, we always use a twenty-four hours' preparation, if possible, with the alimentary tract. I do not feel that we are justified in giving the anesthetic with a full alimentary tract, because we can cause emesis by tickling the palate, by having the patient drink warm salty water, and by the use of the stomach tube, and evacuation of the bowels can be secured also.

The mental attitude and the confidence of the patient are very strong factors in the giving of the anesthetic. The patient should be assured by the quiet attitude of the physician and by a careful examination of the pulse, the lungs, and the mouth—even if this examination has been previously made by the attending physician—that his condition is fit at that present moment to take an anesthetic with safety. It is a reassurance to him to be examined immediately before the operation.

I fully approve of the preliminary morphine and atropine before the ether.

One more point that I have found of advantage is in arranging a signal with my patient, which consists simply in his raising his finger

when he feels that the ether is a little too strong. When this signal is given, we raise the point of the cone a little; the patient gets a whiff of fresh air, and is assured that you are paying attention to him exclusively. He immediately takes another breath. By quiet talking and giving him a mental suggestion that he is going to sleep and that everything is going well, we find that the giving of the anesthetic is not what it used to be with the old cone method causing choking and strangling.

The present methods of giving anesthetics also allow the patient to assume the sitting position or any other convenient to the surgeon. I wish to refer particularly to the position of the head, as spoken of by Dr. Rand; the position most convenient to the patient and in which he will take the ether most quietly is the position of choice.

The details of the drop method have been admirably given by Dr. Rand. The giving of anesthetics by means of nasal tubes is not advisable, unless required by the surgeon.

In regard to nitrous oxide, this is not an anesthetic for the dentist alone; we are now beginning to appreciate its advantages in major surgery. It allows patients with flabby tissues and irritation of the lungs, who cannot stand ether on account of the liability to produce a condition of shock, to undergo anesthesia, as they can rally from it quickly and without much depression.

PAPERS READ AT COUNTY
MEETINGS

Papers Read at County Meetings.

HARTFORD COUNTY.

October 27, 1908.

ADDRESS BY THE PRESIDENT.

Dr. C. M. Wooster.

PAPERS AND DISCUSSIONS.

- Bacterial Vaccine Therapy, . . . Dr. A. H. Griswold.
Discussion, . . . Dr. C. T. Beach, Dr. H. F. Stoll.
Therapy of the Prostate, . . . Dr. C. S. Stern.
Discussion, . . . Dr. Nathan Mayer, Dr. T. E. Reeks.
The Diagnostic Use of Tuberculin, with special reference to the
Newer Methods of Administration, . . . Dr. H. F. Stoll.
Discussion, . . . Dr. W. B. Bartlett, Dr. W. R. Steiner.
Evolution of the Treatment of the Enlarged Prostate,
Dr. M. M. Johnson.
Discussion, . . . Dr. O. C. Smith, Dr. J. J. Boucher.

April 6, 1909.

PAPERS AND DISCUSSIONS.

- Extra Uterine Pregnancy, . . . Dr. J. J. Boucher.
Discussion, . . . Dr. T. W. Chester, Dr. A. J. Wolff.
Typhoid Carriers with special reference to the Gall Bladder,
Dr. K. E. Kellogg.
Discussion, . . . Dr. J. W. Felty, Dr. O. C. Smith.
Colles Fracture, . . . Dr. P. P. Swett.
Discussion, . . . Dr. E. L. Whittemore, Dr. E. A. Wells.
Cardiac Arrhythmia, . . . Dr. W. R. Steiner.
Discussion, . . . Dr. Wm. Porter, Jr., Dr. E. K. Root.
Diseases of the Pancreas, . . . Dr. E. J. McKnight.
Discussion, . . . Dr. E. P. Swasey, Dr. E. R. Lampson.

REPORTS OF CASES.

- Inflammation of Meckel's Diverticulum, . . . Dr. E. A. Wells.
Foreign Bodies in the Vitreous Humor and the Interior of the Eye
in general, . . . Dr. E. T. Smith.

NEW HAVEN COUNTY.

October 22, 1908.

DIABETES.

- Ætiology and Pathology, . . . Dr. George Blumer.
Symptomatology and Occasional Complications, . . . Dr. F. G. Graves.
Treatment and Prognosis, . . . Dr. Gustavus Eliot.

DISSERTATIONS.

Dr. J. L. Moriarty.
 Dr. E. Reed Whittemore.
 Dr. Louis H. Wilmot.

April 22, 1909.

REMEDIAL MEASURES OTHER THAN DRUGS.

Electro-Therapeutics, .	Dr. Charles A. Brown.
Hydro-Therapeutics,	Dr. Charles E. Peck.
Thermaero-Therapeutics, .	Dr. Clarence E. Skinner.
Swedish Movements and Massage,	Dr. J. W. Seaver.

DISSERTATIONS.

Dr. T. M. Bull.
 Dr. H. G. Anderson.
 Dr. W. J. Sheehan.

SEMI-ANNUAL MEETING OF THE CONNECTICUT STATE MEDICAL SOCIETY
WITH THE NEW LONDON COUNTY MEDICAL ASSOCIATION.

October 29, 1908.

11.00 A. M.

CONJOINED SESSION.

PRESIDENTS' ADDRESSES.

PAPERS.

Drainage of the Bladder,	. . .	Dr. George R. Harris.
Discussion, .	. . .	Dr. O. C. Smith, Dr. L. W. Bacon.
Heredity—Environments,		Dr. Francis N. Braman.
Discussion, .		Dr. Gustavus Eliot, Dr. W. H. Carmalt.

2.00 P. M.

SYMPOSIUM ON TUBERCULOSIS.

The Early Diagnosis of Pulmonary Tuberculosis,

	Dr. William B. Bartlett.
Discussion,	Dr. C. B. Graves, Dr. R. W. Kimball.
The Home and Sanitorium Treatment of Tuberculosis,	

	Dr. David R. Lyman.
Discussion,	Dr. E. P. Douglass, Dr. A. W. Nelson.
The Surgical Aspect of Tuberculosis, . . .	Dr. Ansel G. Cook.
Discussion,	Dr. Patrick Cassidy, Dr. G. H. Jennings.

DISCUSSION ON SYMPOSIUM.

Dr. William Porter, Jr., Dr. John P. C. Foster, Dr. Edward K.
 Root, Dr. Joseph Marshall Flint.
 General Discussion.

NEW LONDON COUNTY.

April 1, 1909.

READING OF ANNUAL DISSERTATIONS.

LaGrippe,
Pneumonia, .Dr. Geo. H. Jennings.
Dr. R. W. Kimball.

VOLUNTEER PAPERS.

FAIRFIELD COUNTY.

October 13, 1908.

Treatment of Pneumonia, Dr. John L. Andrews, New York City.

Discussion, Dr. Russell W. Lowe, Dr. George B. Cowell.

Incontinence of Urine in the Parous Woman, Dr. Samuel M. Garlick.

Discussion, Dr. Frank M. Tiffany.

The Broad Opportunity of the Regular Practitioner of Medicine,

Dr. H. F. Brownlee.

Discussion, Dr. William H. Donaldson.

April 13, 1909.

READING OF PAPERS.

Some Rare Cases, Dr. Wm. Loomis Griswold.

Diagnosis of Diseases Affecting the Pylorus, Duodenum and Gall
Bladder, Dr. Louis M. Gompertz.

DINNER 1.15 P. M.

Remarks on Surgical Work upon the Pylorus, Duodenum and Gall
Passages, Dr. Robert Abbee, New York City.

Discussion of Drs. Gompertz and Abbee Papers.

WINDHAM COUNTY.

October 14, 1908.

Acute Specific Urethritis, Dr. W. H. Judson.

The Benefits of Saline Cathartics, Dr. C. E. Simonds.

Psycho Therapeutics, Dr. Rienzi Robinson.

The Diagnosis and Treatment of Certain Fractures,

Dr. Homer Gage, Worcester, Mass.

April 15, 1909.

Tetanus, its Serum Therapy (with report of a case),

Dr. Owen O'Neil.

The Normal Confinement,

Dr. E. F. Perry.

FIVE MINUTE PAPERS.

Veronal,

Dr. F. E. Guild.

Aspirin,

Dr. R. Robinson.

Tuberculin,

Dr. M. J. Bullard.

Urotropin,

Dr. G. M. Burroughs.

Heroin,	Dr. R. C. White.
Diphtheria Antitoxin,	Dr. C. C. Gildersleeve.
Discussion of papers in order of each.	

LITCHFIELD COUNTY.

October 13, 1908.

ADDRESS BY THE VICE PRESIDENT.

Dr. S. G. Howd.

SPECIAL PAPER.

The Educational Duty of the Physician, Dr. George H. Wright.

PAPERS BY INVITED GUESTS.

The Early Diagnosis of Some of the More Common Surgical Affections, Dr. Charles H. Richardson.

Surgery as a Cure for Stomach Lesions, Dr. Daniel F. Sullivan.

The Objective Symptoms of Diseases of Children, Dr. Walter G. Murphy.

April 27, 1909.

PAPERS BY MEMBERS OF THE ASSOCIATION.

Surgery of the General Practitioner, Dr. D. D. Reidy.

Volvulus of the Sigmoid Flexure, with Report of a Case, Dr. J. S. Chaffee.

Fetal Dystocia from Persistent Occipito-Posterior Position, Dr. R. S. Goodwin.

Some Considerations of Medical Ethics, Dr. J. C. Kendall.

ADJOURNMENT FOR DINNER.

PRESIDENT'S ADDRESS.

Smallpox in the Country Town, Dr. I. L. Hamant.

PAPERS BY INVITED GUESTS.

Electricity in Modern Medicine, Dr. A. P. Merrill, Pittsfield, Mass.

Fibroid Tumors of the Uterus, Dr. P. H. Ingalls, Hartford.

MIDDLESEX COUNTY.

October 15, 1908.

DISCUSSION—MENINGITIS.

Leaders:

Leptomeningitis, Dr. Irwin Granniss.

Cerebro-Spinal Meningitis, Dr. J. T. Mitchell.

Hemorrhagic Pachymeningitis, Dr. A. B. Coleburn.

CLINICAL REPORTS.

Remarks on Thyroid Affections, Dr. F. K. Hallock.

Observations at the Congress on Tuberculosis, Dr. J. M. Keniston.

April 8, 1909.

PAPERS.

The Differential Diagnosis in Atypical Appendicitis,

Dr. J. E. Loveland.

A Visit to Nauheim and Dr. Schott,

Dr. K. C. Mead.

Remarks on Psychopathic Wards and Hospitals, Dr. J. M. Keniston.

Two Factors in the Production of Neurasthenia, Dr. F. K. Hallock.

TOLLAND COUNTY.

October 20, 1908.

COUNTY REPORT.

Dr. C. B. Newton.

SPECIAL PAPERS.

Autointoxication of the Alimentary Canal, Dr. James Stretch.

Glaucoma, with Clinical Differentiation from Iritis and Conjunctivitis,

Dr. J. C. Taylor.

Typhoid Fever, . Dr. Wright B. Bean.

Bier's Hyperaemia, . . . Dr. John P. Hanley.

VOLUNTARY PAPERS.

April 20, 1909.

PAPERS AND DISCUSSIONS.

Some Points in Prophylaxis in Children, . Dr. Walter G. Murphy.

Discussion Dr. Fred W. Walsh, Dr. E. T. Davis.

Aural Complications Following LaGrippe, Dr. E. Oliver Winship.

Discussion, . Dr. Wright B. Bean, Dr. Cyrus E. Pendleton.

A Consideration of a Few Acute Surgical Diseases,

Dr. Frederick B. Willard.

Discussion, Dr. Thomas F. O'Loughlin, Dr. Isaac P. Fiske.

OBITUARIES

Lewis Barnes, M.D., Oxford.

FRANK A. BENEDICT, M.D., SEYMOUR.

Lewis Barnes, M.D., was born at Southington, Conn., June 26, 1824, and died at Oxford, Conn., July 5, 1908. He was the son of Julius Stede Barnes, M.D., and Laura (Lewis) Barnes.

Dr. Barnes graduated from Yale in the Class of 1847, taught at Bristol, Conn., and Brooklyn, N. Y., studied medicine at the College of Physicians and Surgeons, New York City, for one year, then entered the office of his uncle, Josiah Barnes, M.D., of Buffalo, N. Y., studying with his uncle and in the medical department of the University of Buffalo, graduating from that college in 1850. He began the practice of medicine in Meriden, Conn., but remained there only a few years. In 1856 he moved to Oxford, Conn., where he remained in active practice up to a short time prior to his death.

He always took an active interest in the affairs of his town and held many public offices of trust. For forty years he was school visitor, thirty years town clerk, and judge of probate for twenty-three years.

He was much interested in the medical society meetings and nearly always present at their gatherings, serving one term as president of his county society.

In 1854 he married Caroline Saltonstall at Meriden, Conn. They had five children, three boys and two girls. One of the boys, following his father's and grandfather's footsteps, studied medicine. Four of the five, together with Mrs. Barnes, survive him.

For over fifty years Dr. Barnes had an extensive country practice, not only covering his own town but extending well into adjoining ones, and it was with great reluctance that he gave up his work when age and failing health compelled him

to do so. His extensive practice and public positions made him a very familiar figure in this part of the county, where he was loved and respected by all.

The day before his death he was about as usual and during the evening watched the Fourth of July celebration. At about nine o'clock he was taken with cerebral hemorrhage, became unconscious, remained so through the night and passed away early on the morning of July 5.

Edwin Bidwell, M.D., Saybrook.

ARTHUR M. PRATT, M.D., DEEP RIVER.

Among the earlier settlers of Hartford, Conn. (about 1639) we find the name of John Bidwell. That this first recorded settler was well-to-do we know from the fact that he owned sawmills and a large and valuable farm in that town. From the account of the marriage of his son to Sarah Wells, granddaughter of Governor Wells, we gather that the family was well connected and held in high esteem.

In the eighth generation from the colonial settler, John Bidwell, we find one Edwin Bidwell, born in South Manchester, Conn., February 9, 1821. He was the second son of Martin Bidwell and Betsey (Morley) Bidwell, who owned a large farm in South Manchester and bought up their sons to be farmers.

Edwin Bidwell lived on the farm of his father, attending school in his native place, first at the district school and later a select school in that town. When probably about sixteen or seventeen he attended the academy at Westfield, Mass., after which he taught school for several years.

At the age of twenty-three he decided to study medicine and with that end in view entered the office of Dr. Hubbard, Sr., at Clinton, Conn. After studying with Dr. Hubbard about a year, he took his first course of lectures at the famous old Berkshire Medical School at Pittsfield, Mass. The next spring he went to New York, attending the lectures and clinics of Drs. Valentine Mott and Willard Parker. Early in the year 1847, he graduated at Yale Medical College, after which he settled in Madison, Conn., going there in February, 1847, and remaining over two years. In August, 1849, he removed to Westbrook, taking the practice of Dr. Horace Burr, the latter retaining his old practice in Westbrook, while Dr. Bidwell took the Haddam practice.

On April 26, 1860, Dr. Bidwell moved to Deep River, taking the practice of Dr. Rufus Baker. Here for nearly half a century he lived, achieving his greatest success as a practitioner, and here he died, December 13, 1908, at the close of the Sabbath day.

At the time of his death Dr. Bidwell was the oldest member of the Middlesex County Medical Association, being eighty-seven years and ten months, having practiced medicine sixty-one years and nine months.

In early life he united with the church in South Manchester and on settling in Deep River became a member of the Congregational church in that place, of which church he remained a member until his death.

Dr. Bidwell was twice married. His first wife was Maria C. Lee of Madison, who died in 1873. By this marriage he had three children: Elliott L., of Deep River; Eva M., wife of T. L. Parker of California; and Dr. Edwin H., of Colorado. His second wife was Mary B. Miner of Old Lyme, whom he married in 1873 and by whom he had one daughter, Margaret, wife of Frederick Kellog of Dallas, Texas.

Dr. Bidwell in politics was a Republican, always voting and supporting that party.

In his chosen profession Dr. Bidwell was extensively known in lower Middlesex County, having achieved a large practice among the best families in three or four adjoining towns. He represented the old school physician in the highest development. From a long line of New England ancestors, who for seven generations had been among Connecticut's sturdiest citizens, his long life as a Christian physician surely shows the result of many generations of right living and high intellectual development. Always dignified and gentle in the sick room, yet with the keenest sense of humor, he was beloved by patient and honored by all.

Charles Carrington, M.D., Farmington.

GEORGE F. LEWIS, M.D., COLLINSVILLE.

It is with regret that I was not better acquainted with Dr. Charles Carrington that I have prepared this obituary. Our professional and social relations were always pleasant, though brief—mostly roadside, stopping for talks over various cases within our common knowledge—and after such occasional meetings the long drives were shortened because I had something new to think of. An occasional talk at medical society meetings always left a feeling that he should have entered a larger field of work, where his abilities would have been more fully recognized.

Dr. Charles Carrington was born in Farmington, Conn., February 3, 1839, and was the son of Dr. Edwin Carrington, a resident of the town, and for many years identified with its interests. Dr. Charles Carrington secured his early education in his home town, graduating at Deacon Hart's preparatory school in the same town. Deacon Hart's academy in those days was of the best. Failing health prohibited him from entering Yale, as was intended. He read medicine with Dr. Frank Wheeler of Farmington and, following perhaps an inherited tendency, he entered the College of Physicians and Surgeons in New York City in 1858. In his second year his health compelled him to leave the North for the South, but with his determination to succeed, he obtained a position in the hospital at Charleston, S. C., and continued his work. Regaining his health, he returned to New York in time to graduate with his class in 1860. He then returned to Farmington and from the beginning maintained a most successful practice.

He was a man of positive opinions, yet always open to conviction, and when convinced, no one would yield more grace-

fully and thoroughly than he. He was a member of the Hartford County Medical Association and the Connecticut State Medical Society, and a delegate from the latter to the National Medical Convention at Philadelphia in 1896.

Dr. Carrington died in Farmington, May 20, 1908, of cerebral hemorrhage. He leaves a widow, who was Miss Elizabeth Whiting, and a daughter, Sarah, the wife of Archdeacon Allen E. Beaman of Fairfield, Conn.

Franklin Pierce Clark, M.D., Danbury.

NATHANIEL SELLECK, M.D., DANBURY.

Frank Pierce Clark, M.D., of Danbury died in that city on March 28, of pneumonia following the grippe. Born in that city in 1858, he received his education in the public schools, entered the office of the late Dr. A. T. Clason as a student when but eighteen years of age, and three years later took his degree from the College of Physicians and Surgeons in New York City. Returning to Danbury directly after his graduation, he began the practice of medicine, associated for a time with his preceptor, but later opened an office for himself and remained in active practice until his death.

In 1881 he married Miss Kate Benjamin, who, with two daughters, survives him. He also leaves two sisters, Mrs. John Averill of Norwich, Conn., and Mrs. Henry Smith of Brooklyn, N. Y.

He was a member of the state, county and local medical societies: had been vice president of the first and president of the last.

This tells the story briefly to the world of the life of Dr. Clark, and did we follow his wishes, it is all that he would have us say. But to those of us who were associated with him, who knew him more closely and saw him in his everyday life, there was a manhood and a depth of character that we see all too infrequently; a depth of human nature that did not proclaim itself from the housetops, but rather flowed through the modest channels of a busy doctor's life.

To those of you that had not the pleasure of his acquaintance it is a difficult matter to explain to you the unique position that he occupied. A kindly heart, a cheery manner, always the perfect gentleman, combined with a thorough knowledge, ripened by years of experience in his chosen life's

work, raised him nearer the ideal of the true physician than most of us can hope to attain. He saw the broader side of the practice of medicine. The conception that he formed of it at the beginning of his career and which he followed faithfully to the end was that the first duty of a physician was to relieve human suffering; that the Hippocratic oath was as binding to-day as it was in the days of the Greek physician and that the hustle and bustle of the nineteenth and twentieth centuries did not and should not invalidate the trust. He followed this conscientiously and thoroughly. If a patient could recompense him, all well and good; if they could not, it was just the same and was no valid reason that he should allow them to suffer. Those from whom he knew he could possibly receive no pay received just as good treatment and just as painstaking care as those more fortunate in this world's goods. In fact, if one or the other had to be neglected, it was more often the latter than the former; they could get another physician if it was necessary, the probabilities were that the former could not.

The last work that he did was a typical example of his whole professional life. He was called at one o'clock in the morning to attend an obstetrical case in a member of that social class that exist upon the charity of their fellow-beings. A number of us had refused, preferring the comfort of our beds to spending the night in work when our only reward would be in the consciousness of duty done. Not so with him. The cry of suffering, coupled with the fact that they could not obtain a physician, took him from his bed, although suffering with the grippe, kept him out until morning and sent him back with a chill which ushered in an attack of pneumonia from which he died four days later.

We look for this spirit in the younger members of the profession who have a reputation to make, but in one who could have chosen his work from the best and then have had more than he could possibly do, we see it much less frequently. We look upon this type of a doctor and say, "Yes, he is a good man, but he is killing himself for nothing; he attends cases

when he knows that he will not receive his pay." But when we look upon the reverse side of the picture and see the suffering that he relieves—for the poor suffer as much as the rich and under far less favorable environment—the sorrow which he lightens, the happiness that he carries into many homes, who will gainsay the fact that the reward he receives in gratitude and love is not greater than dollars and cents?

To the younger members of the profession in Danbury, and we were all younger than he, he was a bulwark in times of perplexity and doubt. His reputation in the city and vicinity made him a welcome counselor in every home and his opinions were always valuable. He not only set the attending physician right, if he was wrong, but never took the credit to himself; invariably leaving the impression with the family that the one in charge was doing all that was possible. If he had any suggestions to make he always gave them to the physician and no hint of them to the family. He would often say, "I would do thus and so, or I would give such and such a medicine, but wait until your next call before making the change; do not do it now," always looking to the feelings of his brother practitioner rather than to his own reputation. If we all did this how much more unity and good fellowship there would be amongst us.

The demonstrations of sorrow upon every hand, the cessation of business upon the afternoon of the funeral services, the concourse that gathered at his bier, all demonstrated the esteem and affection in which he was held by the community. They all had a grief in common—they had lost a true friend.

He was of a type that is fast disappearing—the family physician. He aided and sympathized with them, not only in their sickness but in all their troubles and afflictions. He was their steadfast friend under all conditions, and he is mourned nearly as much by those who never employed him as by those who did. His cheery salutation, his humanity and his wholeheartedness was the common property of all.

Had he looked upon the practice of medicine as a trade and not a profession; had he been guided by the laws of business

and not by sympathy for the ill and afflicted, he could have amassed a fortune. But he chose otherwise, and if there is anything in this life beyond commercialism, if there is any reward other than that of the check book, who will say that he did not choose wisely? He will be held in loving remembrance after those of us who have been more careful of the financial side have been forgotten; our places will be filled—his never.

We all of us have a philosophy of life that is the star toward which we direct our efforts, and the practical result of those efforts tells better than words what we are.

In looking at the life of Dr. Clark, all too brief as it was, for he fell in the fulness of his powers, we can sum it up in devoted and unselfish service to others. And when he approaches the Recording Angel he can say as did Ben Adhem of old,

Write me then

As one who loves his fellow-men.

* * * * *

And lo, Ben Adhem's name led all the rest.

Alfred Russell Goodrich, M.D., Vernon.

ELI P. FLINT, M.D., ROCKVILLE.

Alfred Russell Goodrich, M.D., who died at Dobsonville, in the town of Vernon, Conn., December 20, 1908, at the advanced age of ninety years, had been for fifty-five years engaged there in the practice of medicine, and had for many years been prominently identified with the educational, industrial, social and political interests of that town.

Goodrich was descended from a notable ancestry of Puritan and New England stock.

The immigrant ancestor, Ensign William Goodrich, was born in Suffolk County, England, was married in Connecticut in 1648, was made a freeman in 1656 and deputy to the General Court in 1662. He was one of the Grand Jury and ensign in the train band. Dr. Goodrich was his lineal descendant in the sixth generation and in each generation the ancestors were prominent as patriots and influential and useful citizens.

George Goodrich, the grandfather of Dr. Goodrich, served in the army in the War of the Revolution, and was on duty at Saratoga in 1777, when General Burgoyne surrendered to General Gates. After the war ended, he lived at Gill, Mass., where he died at the age of ninety-two years. His son, Alfred, the father of Dr. Goodrich, married Abigail Howland, who was the mother of the subject of this sketch, and a lineal descendant in the seventh generation of John Howland, who came to America in the *Mayflower*.

Dr. Goodrich was born in Gill, Mass., September 29, 1818. When he was only three years of age, his mother died, and his childhood was spent in the care of his aunt, Mrs. Mary W. (Goodrich) Smith, at her home at Vernon Center, Conn.

Ambitious to secure a good education, he earned his livelihood by working as a farm hand during summers, studying

diligently evenings, attending the public schools during winter, and also a private school during two winter terms.

Finally, he secured an academic course at Deerfield, Mass. Then he taught in the district schools at Vernon, which he had attended in his boyhood. Later, he became an associate teacher in the academy from which he graduated, and finally, its principal.

He was a diligent and judicious reader, and after a time, decided to take up the study of medicine. This he did with Dr. Alden Skinner as preceptor, entered the Berkshire Medical College in 1843, and graduated, an honor student, in 1846. He also attended a post-graduate course in the College of Physicians and Surgeons, New York City.

He practiced for a time in New York City, but after a severe attack of ship fever, he returned and located permanently at Vernon.

He sometimes referred, with evident satisfaction, to the many severe diseases which had attacked him, and from which he had entirely recovered. These included smallpox, ship fever, spinal meningitis, scarlet fever, typhoid fever, brain fever, pneumonia and three attacks of diphtheria. Thus, he was well prepared, by his own unfortunate experience, to appreciate the sufferings of his patients.

Dr. Goodrich's ambition for the acquisition of knowledge, and the desire to be useful to his fellowmen, prepared him well for public service, while his fine physique, unassuming, dignified, yet genial manner, won for him the favor of many, and he was often selected to fill honorable and important public positions.

He was several times president and fellow of the Tolland County Medical Association, and was president of the Connecticut State Medical Society in 1879.

He was a member of the committee of five that had in charge the construction of the Memorial Building, which includes the town hall, public offices, etc., in Rockville, and the Rockville High School building, and he delivered the historical address at the dedication of the latter.

He was many years health officer of the town of Vernon and, at the time of his death, was, and had been for a long period, a trustee of the Rockville Savings Bank, a pension examiner for Tolland County, a member of the Tolland County Medical Association and the Connecticut State Medical Society, also of Fayette Lodge, A. F. and A. M., honorary member of the Putnam Phalanx, member of the Connecticut Prison Association from its foundation, of the Sons of the Revolution, of Hubbard Escort, trustee of the Rockville Public Library, a member of the Rockville High School Committee and also of the Board of Education, of which latter he had held the office of president for more than thirty years.

He was for years interested in business enterprises, was one of the organizers of the Mutual Benefit Life Insurance Company, formerly of Hartford, and was for six years its president. He was for some time identified with the cotton manufacturing interests in Vernon, and was formerly a member of the Connecticut State Board of Agriculture.

But it was in the political field that Dr. Goodrich was more widely known. Always a Democrat, he was of necessity classed with the minority in a town strongly Republican. Here his impressive personality and executive force supplied what was lacking on account of party deficiency. He was elected to the State Legislature in 1870, winning the distinction of being the first Democratic representative sent from the town of Vernon. He served as a member of the Educational Committee and of the Committee on Woman's Suffrage, his casting vote on the latter subject making the report favorable to suffrage.

In 1873 he was elected state comptroller, and served in that office three years in succession, being twice reelected. He exhibited especial ability in the discharge of its duties, reducing, considerably, the state expenditures. He was elected state treasurer in 1882, was reelected the year following, and demonstrated a similar wise efficiency in performing the functions of that office.

Several weighty state transactions were completed satisfactorily during his administration and under his supervision. One was the issuing of more than one million dollars in bonds to which his personal signature was affixed.

Dr. Goodrich was married October 28, 1847. His wife was Charlotte Dobson, youngest daughter of Peter Dobson, who was the founder of the cotton manufacturing industry in the town of Vernon, and also a prominent Democrat. Mrs. Goodrich died January 20, 1902.

While the doctor's robust constitution sustained him through so long a life, the weight of years gradually made its impress, and he succumbed to glosso-labio-pharyngeal paralysis following an attack of epidemic influenza.

One son, George Dobson Goodrich, survives, residing at the old homestead, Vernon. There are also two grandchildren and one great-grandchild.

Andrew Bennett Gorham, M.D., Wilton.

HOWARD P. MANSFIELD, M.D., RIDGEFIELD.

Andrew Bennett Gorham, M.D., the oldest of three children of George M. Gorham and Angeline (Buckley) Gorham, was born in Weston, Conn., January 1, 1851.

As his name implies, he was of the direct line and lineage of the famous Bennett family of physicians and surgeons of whom Fairfield County is so justly proud, his grandmother being a sister of the late Dr. E. P. Bennett of Danbury and Frederick Norman Bennett of Newtown. Another illustrious member of this family was Dr. Hanford Nichols Bennett of Bridgeport. From this ancestry he early turned his attention to medicine and graduated from Yale Medical School in the Class of 1879. In August of the same year he located in Wilton and immediately assumed an active practice, which he followed with vigor and zeal until the time of his death.

In his everyday life quite and unassuming, he sought no position of public or political preferment. Professionally possessed of a mind above the average of intelligence, he created for himself a place among the hearts of his clientele that will only be effaced by the passing of his generation, and with his fellows, respect for his opinions and confidence in his judgment.

He was town health officer from the time of the inception of that office until his death, and medical examiner for thirty years. He was a member of the Fairfield County Medical Association and the Connecticut State Medical Society and was enrolled with the American Medical Association.

His social affiliations were confined to the Masonic fraternity, of which he had attained rank in the Consistory, 32°.

He was married, in 1881, to Deborah Hill of Redding, and his home life was characterized by the same tenderness and care which endeared him to the hearts of his people.

He received his last call March 29, 1909, leaving a widow, a brother, Dr. Frank Gorham of Weston, and a community to mourn his loss.

Elias Buel Heady, M.D., Milford.

ALBERT F. TUTTLE, M.D., MILFORD.

Elias Buel Heady, M.D., who passed from a life of useful activity to his eternal reward on December 16, 1908, was born in the town of Norfolk, Conn., on the twenty-eighth day of July, 1846. Educated in the public schools, he began the study of medicine under Dr. Knight of Lakeville, entered Yale Medical School and graduated in the Class of 1872.

He entered upon the practice of medicine at Cornwall, where he remained for about eight years.

On February 10, 1874, he married Miss Julia V. Kellogg. They were blessed with four sons: Clarence, who died in 1886; William Henry, who died in 1896; Louis E. and Carlton K., again mentioned below.

In 1880 Dr. Heady moved to Milford, where he remained until his death.

His religious affiliations were with the First Congregational Church, of which he was a member and a creditably regular attendant. He was a member of the New Haven Medical Association, the New Haven County Medical Association, the American Medical Association, and an honorary member of the Bridgeport Medical Association. For twenty years he was town health officer and medical examiner for the coroner.

As a man, esteemed and respected in the community in which he lived, by those among whom he labored faithfully and well, by fellow-members of his chosen profession, by all men who knew him or had associations with him, professionally or socially; assuming the responsibilities of life, and those sacred ones that demand the highest attainment and exercise of efficiency, the fullest appreciation of the honor and confidence reposed in those whose mission is to minister to the relief and to lessen the sum total of human suffering, and, how often, on

whose skill depends the prolonging of life, it may be one of immeasurable usefulness; faithful in the administration of his stewardship, he attained a measure of success that our finite judgment cannot but deem fitting the commendation: "Well done, good and faithful servant." But who shall say that He, who alone can read our inmost thoughts, our aspirations and our motives, and who squares our deeds, thereby to determine our merited reward, did not find him *worthy*, far beyond the ken of those who *thought* they knew him; e'en those who sometime may have harshly judged. In the accumulation of the "treasures of earth," he prospered to a fair degree.

On the morning of August 12, 1905, while making calls in his automobile, the car becoming unmanageable, he jumped from it and fell, sustaining a fracture of the neck of the left femur. For months, with remarkable fortitude and hopeful courage, he endured pain, oftentimes excruciating. Several times he resumed practice, persisting with much difficulty until forced to give up. Solid union of the fracture not having taken place after twenty months, he went to New York and submitted to an operation of "pegging" by the late Dr. Carlton Flint. Afterwards he got about and again to a limited extent resumed practice, continuing until some months after the operation, when nephritis became manifest and, running its course with its attendant complications, the end came on the above-mentioned date.

Dr. Heady is survived by his widow, five brothers and two sons: Louis E., who graduated from Sheffield Scientific School as a metallurgist and now occupies a position as assistant superintendent in the Bethlehem Steel Works of Bethlehem, Pa.; and Carlton K., to whom his father's death was an additionally sad misfortune, as destructive of the most cherished of his plans and ambitions for the future. He purposed to study medicine with his father, to be a help to him in his declining years and to succeed to his practice.

The funeral services on December 19 were largely attended. A portion of the services were in charge of Wopowage Lodge,

I. O. O. F., of which the doctor was a member. Besides the local physicians, all of whom were present, there were representatives from adjoining towns, notably Stratford and Bridgeport.*

* Owing to illness, Dr. Beach was unable to perform the duty assigned, and at his request the above was prepared by Dr. A. L. Tuttle. Dated at Milford, Conn., April 13, 1909.

T. Morton Hills, M.D., Willimantic.

On Saturday morning, January 23, 1909, Dr. T. Morton Hills died at his home at 17 North Street, Willimantic, Conn., of pneumonia, after a sickness of less than four days.

He was the son of Rev. Israel Hills and was born at Lovell, Maine, May 12, 1839.

His preparation for college was made at East Windsor Hill Academy. Having decided upon the practice of medicine as a profession, he spent one year at Staffordville, Conn., with Dr. S. F. Pomeroy, after which he entered the Yale Medical School, receiving his diploma from this institution in 1863.

During his course of study at Yale he was office assistant to Dr. P. A. Jewett and Dr. T. H. Townsend. With these men he had exceptional opportunities for valuable surgical training, which later in life he put to excellent and worthy use.

In October, 1862, he was first assistant surgeon of the 27th Connecticut Volunteers. In 1863 he started for Norfolk, Va., in answer to a call for physicians from the mayor of that city. After the fall of Richmond Dr. Hills located there and engaged in private practice, where he was also connected with the Freedman's Bureau, having charge of the Chimborazo Hospital. After one year he left Richmond and in 1866 came to Willimantic. He acquired a large practice here, which he retained until the time of his death.

He was an interested and earnest worker in the Windham County Medical Association—its president in 1885; president of the Connecticut Medical Society in 1887, and vice president of the Willimantic Medical Association at the time of his death. He was a member of the American Medical Association and the National Association of Railway Surgeons.

In 1870 he was appointed local surgeon for the New York & New England Railroad (now a division of the New York, New Haven & Hartford Railroad), and also for the Central Vermont, which positions he filled with credit for many years.

He was twice married and two daughters survive him: Mrs. Dickerson G. Baker and Dr. Laura Heath Hills, the latter a physician of high standing in Willimantic and president of this county's association in 1901.

Dr. T. Morton Hills was largely endowed with qualifications which are sure to bring success to one in the practice of medicine; a charming personality, knowledge and skill in his profession, a heart overflowing with sympathy for all in sorrow, and courage to do anything to relieve human suffering or save life.

No one, rich or poor, ever sought his aid, night or day, but what it was cheerfully given. Such service won from its recipients, not only its ordinary price, but lasting gratitude and affection; and when the sad news came of his sudden illness and death, gloom and sorrow darkened many homes in Willimantic.

In frequent consultations, covering a period of nearly thirty years, I have always found him the soul of honor. Were there any criticisms of treatment, they were most kindly given and future relations with your patient were never less pleasant because of his visit.

His funeral, conducted most impressively by Rev. Alfred Free, was a private one, attended only by the family and his professional brethren in the city and county. In the morning an opportunity was offered the public to see his face and the hundreds of people of all classes and nationalities who saw him for the last time left his body with a common sorrow, their sad faces and tear-dimmed eyes being a silent but an eloquent tribute of esteem.

With a heart full of affection, he did his professional work well, and though now dead, in memory he commands the honor, devotion and love of all those who appreciate the essentials of a noble man.

Charles Henry Hubbard, M.D., Essex.

FREDERICK B. BRADEEN, M.D., ESSEX.

Charles Henry Hubbard, M.D., was born in Bloomfield, Conn., July 31, 1836.

He was the son of Denison Henry Hubbard, M.D. (Yale 1829), and of Pamela A. (Hubbard) Hubbard, a daughter of Hon. David Hubbard of Glastonbury, Conn.

When he was eight years of age, the family moved to Clinton, where Dr. Hubbard attended school, and later attended Yale, and was graduated from Yale Medical School in 1860.

In 1861 he came to Essex, where he practiced until his death, April 10, 1908.

In 1862 he married Cherilla G., daughter of George and Mary Conklin, who with four children survive him.

During his residence in Essex, he was invaluable to the community. He was a member of the Congregational church and a trustee of the Pratt School.

In all questions of importance to the town, he was deeply interested, but it was to his professional work that he was most devoted.

Dr. Hubbard was of that old-fashioned type of physician so rarely seen now. Over-sympathetic and always anxious to help, he was a friend as well as medical adviser to his patients, fulfilling not only his duties as a doctor, but those of a Christian as well.

Although living in a quiet and unostentatious manner his life was one of benevolence and self-sacrifice, and has left for him a name long to be remembered and loved in Middlesex County.

C. J. Leclaire, M.D., Danielson.

WILLIAM H. JUDSON, M.D., DANIELSON.

Dr. Leclaire died at his home in Danielson, April 1, 1909. He was born in St. Louis De Gonzaena, Beauharnais County, P. Q., May 6, 1863, the oldest son of Dr. C. J. and Marie (Berthelot) Leclaire. On his mother's side he was a relative of the Beaudry, Berthelot and Desjardine families of Montreal.

He studied at the Seminary of St. Theresa De Blainville and graduated in 1887 from Victoria Medical College of Montreal.

June 17, 1890, he married Miss Emma Bedard of Helena, Mont. To them were born five daughters and one son, and he is survived by all except one daughter. He has one sister, Miss M. L. Leclaire of St. Theresa, Canada.

Locating in Danielson, which is surrounded by villages with a heavy percentage of Canadian people, he forged rapidly ahead both in his profession and in the social uplift of his people. Of strong personality and bright intellect, he was a leader among his people. He urged upon them the necessities of citizenship and education. He was a strong man in the Republican party and the backbone of many societies.

In his profession he was kind-hearted, good to the poor, and left praises everywhere.

In the fall of 1908, he was cognizant of the coming trouble, but did not relinquish his work till the last of January, 1909. From that time he rapidly declined to his death, which was caused by primary anæmia.

Write this above me when my journey ends,
"He left no dollars but ten thousand friends."

Timothy McCarthy, M.D., Rockville.

ELI P. FLINT, M.D., ROCKVILLE.

When a promising young practitioner passes away, there comes to us an impression as of something accidental, a premature happening, an incident not in accordance with the natural order of events. Such an impression may well be especially marked in considering the case of Dr. Timothy William McCarthy.

Although dying at the early age of twenty-four and after having spent a brief time only in trying to alleviate the physical sufferings of mankind, he had already made a favorable impression as a man and as a physician.

Dr. McCarthy received his preliminary preparation in St. Bernard's Parochial School, Rockville, Rockville High School, and two years in St. Thomas Seminary, Hartford, Conn.

His professional education was secured by a three years' course at Tufts Medical College, Boston, Mass., and one year in Baltimore Medical College, from which he was graduated in May, 1906, with honorable mention.

He began the practice of medicine in Manchester, Conn., and after a few months removed to Rockville, the home of his family, in December, 1906.

Though born in Ireland, Rockville had been his home for fifteen years, and his acquaintances, many of them friends during and since his boyhood, showed their confidence in him by seeking his professional services.

Blessed with an even temper, and carrying with it everywhere a uniform cheerfulness and kindness of manner, he readily won the good-will and friendship of his patients, as well as their confidence in his skill.

The writer having met him, personally and professionally, sufficiently often to become somewhat conversant with his

ability and characteristics, is glad to testify to Dr. McCarthy's thorough understanding of the cases on which they consulted, as well as to his quiet, unostentatious manner and the favorable impression which he, evidently, everywhere made upon his patients.

After practicing in his chosen locality only one year and four months, he was attacked with pneumonia. Under the faithful care of his brother, Lawrence J. McCarthy, also a physician, of Springfield, Mass., he partially recovered, but finally died from a sequel of that disease, pyo-pneumo-thorax, June 10, 1908, in the Hartford City Hospital.

A life so brief and uneventful furnishes little material for record. But more than a passing thought may well be bestowed upon the honorable and healthful effort which develops such a character, with both profit to the individual and advantage to the world.

Gurdon Wadsworth Russell, M.D., Hartford.

EDWARD K. ROOT, M.D., HARTFORD.

Gurdon Wadsworth Russell, M.D., was born in Hartford, Conn., April 19, 1815, the son of John and Martha Wadsworth Russell.

He received his early education in the north part of this city in a small frame schoolhouse on what is now Windsor Avenue, not far from where the Arsenal School now stands. He attended the Hartford Grammar School for a time and later a private school in Manchester, where he prepared to enter Trinity College. He graduated from Trinity College in 1834 and served as a private student with the late Dr. A. Brigham for a year afterwards; then in the fall of 1835 he entered the Yale Medical School. He received the degree of Doctor of Medicine from the Yale Medical School in 1837, and finally settled in Hartford in 1838.

He was active in the general practice of medicine and surgery from this time until he was over seventy years of age, when he retired from active practice of his profession. He died from the effects of the gradual exhaustion of old age, February 3, 1909, in the ninety-fourth year of his age.

A history of Dr. Russell's professional life is practically a history of the medical profession of Hartford County for the past seventy years.

He was formerly president of this society, as well as practically a lifelong member. The interests of the Connecticut State Medical Society were always uppermost in his thoughts and it may not be improper to add that early in his professional career he insured his life for the benefit of the Connecticut State Medical Society, which will thereby come into possession of a substantial bequest.

He was one of the charter members of the Hartford Medical Society, his name appearing seventh on the list of the charter

members of that organization in September, 1846. He served as its secretary and later as its president, and likewise showed his interest as well as his affection for that organization by a handsome bequest in his will. He was a member of the Board of Directors as well as a visiting physician to the Hartford Retreat, and throughout his life gave unstinted time, as well as financial assistance, to that institution.

He was one of the founders of the Hartford Hospital in 1857 and was president of the Medical Board, as well as of the corporation; and this institution likewise, while it can record, can never pay, the debt it owes to his foresight, sound judgment and untiring energy.

Dr. Russell's active professional life terminated before the majority of the members of this society entered our profession. He was to them not so much a fellow-practitioner as a wise counselor and friend. Few, or none, now living are in a position to write with full knowledge of Dr. Russell's professional attainments, but to this generation of physicians and surgeons in Hartford County he was far more than a distinguished and able practitioner of medicine.

The unity, harmony and successful organization of the profession in Hartford, both in the Hartford City Medical Society and in the county organization, owe far more to Dr. Russell than can readily be realized, although we all feel the debt. Few organizations of professional men have been so successful, have been less disturbed by friction and rivalry, or have displayed more hearty coöperation to the attainment of any desired end, than has been shown in the history of both the Hartford County and Hartford City Medical societies and both these organizations owe their success in this direction more to Dr. Russell than to any other man.

His intimate knowledge of men and affairs, his unfailing tact, his absolute singleness of purpose and, above all, his absolutely unselfish honesty, made him a counselor and a referee whose opinions and whose verdicts all were glad to accept. It is difficult to overestimate the service such a leader has been to our profession.

Dr. Russell was a man of many interests besides those purely medical. He was fond of history, and was well versed in the early history of our own county and city from a professional point of view and also in the larger historical sense. He was interested in botany and arboriculture and in the cultivation of fruits. He possessed, in addition, sound business judgment and was an excellent adviser in all financial matters.

His service as medical director of the Ætna Life Insurance Company covered a period of over fifty years, and he was easily the senior medical underwriter in this country.

Toward the end of his days, while physically he grew more feeble, the activity and clearness of his mind remained unchanged to the last; his memory was as accurate, his perception as keen, his judgment as sound as at any time in the course of his long years.

Such a lifetime as he passed is granted to but few of the sons of man, but no one can say that he failed to make good use of it, or returned to his Creator his talents unused.

Frederick Spring, M.D., Naugatuck.

THOMAS M. BULL, M.D., NAUGATUCK.

Dr. Frederick Spring, M.D., son of Louis L. Spring and grandson of Rev. Gardner Spring, the noted theologian and pastor of the Brick Church of New York City, was born April 28, 1858, in New York City.

He received his degree in medicine from the medical department of the University of New York in 1885. Soon after that he came to Naugatuck and remained in general practice until his death, which occurred June 13, 1908, shortly after completing his fiftieth year.

He married in 1880 Miss Belle Brockway of Bergen Point, N. J., and leaves four children.

He was a man of magnificent endowments, both mental and physical, and enjoyed for many years a large practice in Naugatuck and surrounding towns.

Thomas Francis Stanton, M.D., Bridgeport.

EDWARDS M. SMITH, M.D., BRIDGEPORT.

The subject of this sketch, Thomas Francis Stanton, M.D., was born in Hartford, Conn., in 1864, the son of Thomas P. and Anna Stanton. He was educated in the public schools of his native city, attending the West Middle District and Hartford High School. At the age of nineteen years he went West and settled in San Francisco, where he remained for four years and then returned East to New England again, becoming a traveling commercial salesman. After following this occupation successfully for a few years, he took up the study of medicine and was graduated from the College of Physicians and Surgeons, Baltimore, in 1896, standing well up in the front rank of his class and being elected its vice president. After receiving his degree, Dr. Stanton came to Bridgeport, opened an office and practiced in that city until his death on May 8, 1909, twelve years later.

Of large frame and robust physique, Dr. Stanton, who was never ill, paid little attention to the sudden attack which came on in the evening after a day of more than usual physical exertion, and the following morning went to make a visit upon a critically sick child, but collapsed at the bedside and had to be brought home. Only on the day following did he send for a brother physician, who had him removed to Dr. J. W. Wright's private hospital, where he was operated upon for a fulminating appendicitis with general peritonitis. The patient made a good fight, but succumbed to the infection three days later.

Dr. Stanton was never married. He left one brother, James Jefferson Stanton, who was graduated from the Yale Law School, Class of 1908; and one sister, Miss Mary Stanton,

who had kept house for him for some years. Both parents had died some time previously.

Dr. Stanton was a member of the American Medical Association, the Connecticut Medical Society and the Fairfield County and Bridgeport Medical associations. He was also a member of many fraternal organizations, being a 32d degree Mason and a Shriner and a member of the I. O. O. F., S. of St. G., F. of A., and others. He was a member of the South Congregational Church and its Men's League. In politics the doctor was a staunch Republican, but never held any public office.

Dr. Stanton was a whole-souled, genial man, always ready with some cheerful word, good story or characteristic witticism—best liked by those who knew him best. Big-hearted, he was always ready to respond to a sick call and frequently worked late into the night. By his faithfulness and attention to them in their need he won the best regard of his large clientele—children as well as those older—who almost without exception looked upon him as their friend as well as physician. His funeral, which was one of the largest ever seen in Bridgeport, was held from the South Congregational Church, whose large auditorium was filled to overflowing with delegations from the various bodies with which Dr. Stanton was affiliated, and very many following patients and friends. After the church services the body was taken in charge by Hamilton Commandery, K. T., the honorary bearers being well-known sir knights, all members of the Bridgeport Medical Association and the committal at the grave was according to the Knights Templar ritual.



CHARTER AND BY-LAWS.

Resolution Amending the Charter of the Connecticut Medical Society.

GENERAL ASSEMBLY.

JANUARY SESSION, A.D. 1905

Resolved by this assembly:

Section 1. That the charter of the Connecticut Medical Society, approved June 5, 1834, and as the same has been amended from time to time, be and the same is hereby amended so as to read as follows:

That all persons who are now members of the Connecticut Medical Society and all physicians and surgeons who shall hereafter be associated with them in pursuance of the provisions of this resolution shall be and remain a body politic and corporate by the name of The Connecticut State Medical Society; and by that name they and their successors shall and may have perpetual succession; shall be capable of suing and being sued, pleading and being impleaded, in all suits of whatever name and nature; may have a common seal and may alter the same at pleasure; and may also purchase, receive, hold, and convey any estate, real and personal, to an amount not exceeding one hundred thousand dollars.

Sec. 2. The superintendence and management of the corporation shall be vested in a board to be known and called by the name of The House of Delegates of The Connecticut State Medical Society, which board shall have power to establish offices in said corporation and prescribe the duties of the several officers and of the members of said corporation and may fix their compensation; to establish the conditions of admission to and dismission and expulsion from said society; to lay a tax from time to time upon the members, not exceed-

ing five dollars in each year, and to collect the same; to hold and dispose of all moneys and other property belonging to the corporation in such manner as they may deem proper to promote the objects and interests of the society; and in general to make such by-laws and regulations for the due government of the society, not repugnant to the laws of the United States or of this state as may be deemed necessary.

Sec. 3. The House of Delegates of The Connecticut State Medical Society shall be composed of (1) ex officio, the president and secretary of the society; (2) delegates to be elected annually as hereinafter provided, by the several county medical associations in this state which heretofore have been and now are affiliated with The Connecticut Medical Society; and (3) eight councilors to be elected from time to time as hereinafter provided.

Sec. 4. An annual meeting of the corporation for the election of officers and such other business as may from time to time arise, shall be held during the month of May in each year and upon such day in said month as the House of Delegates shall from time to time prescribe.

Sec. 5. At a meeting to be held at least twenty days in advance of the annual meeting of the corporation in each year, every affiliated county association shall elect a delegate or delegates to represent it in the House of Delegates of this society in the proportion of one delegate to each thirty-five members, or any part of that number, and the secretary of such affiliated county association shall send a list of such delegates to the secretary of this corporation at least twenty days before the date of said annual meeting.

Sec. 6. The first councilors shall be appointed by the president, one from each county, who shall serve for one year or until their successors shall be elected. At their annual meeting in the year 1906, each affiliated county medical association shall elect one councilor, of whom those elected in Hartford, New London, Windham, and Middlesex counties shall serve for one year, and those elected in New Haven, Fairfield, Litchfield and Tolland counties shall serve for two years; and

at the expiration of the term of office of the councilors so elected, each affiliated county medical association shall, biennially thereafter, elect a councilor, who shall serve for two years.

Sec. 7. The secretary of every affiliated county medical association in this state shall, in May, 1905, and annually thereafter, at least ten days before the annual meeting of the society, file with its secretary a list of all members of said respective county associations who are at the time in good and regular standing, and thereupon all such persons shall become and be members of The Connecticut State Medical Society without further action.

The Connecticut State Medical Society.

BY-LAWS.

CHAPTER I.

Section 1. Name. The name and title of this organization shall be the Connecticut State Medical Society.

Sec. 2. Purposes of the Society. The purposes of this society shall be to federate and bring into one compact organization the entire medical profession of the State of Connecticut, and to unite with similar societies of other states to form the American Medical Association; to extend medical knowledge and advance medical science; to elevate the standard of medical education, and to secure the enactment and enforcement of just medical laws; to promote friendly intercourse among physicians; to guard and foster the material interests of its members and to protect them against imposition; and to enlighten and direct public opinion in regard to the great problems of State medicine, so that the profession shall become more capable and honorable within itself, and more useful to the public, in the prevention and cure of disease, and in prolonging and adding comfort to life.

Sec. 3. Component Associations. Component Associations shall consist of those county medical associations which heretofore have been and now are affiliated with the Connecticut Medical Society.

Sec. 4. Composition of Society. This Society shall consist of members, delegates, guests, and honorary members.

Sec. 5. Members. Members of this Society shall be members of the component county medical associations.

Sec. 6. Delegates. (1) Delegates shall be those members who are elected by the component county associations; (2) the Councilors; their respective component associations in the House of Delegates of this Society.

Sec. 7. Guests. Any distinguished physician not a resident of this State who is a member of his own State Association, may become a guest during any annual session on invitation of the officers of this Society and shall be accorded the privilege of participating in all the scientific work for that session.

Sec. 8. Honorary Members. Eminent physicians, not residents of this State, may be elected Honorary Members by a major vote of the House of Delegates after nomination of one year, but such shall not exceed three in any one year.

Honorary Members shall have all the privileges accorded by Section 7 to Guests.

CHAPTER II.—MEMBERSHIP.

Section 1. The name of a physician upon the properly certified roster of members of a component association, who has paid his annual assessment, shall be prima facie evidence of membership in this Society.

The annual tax shall be collected from all such members except the secretaries of County Medical Associations, but the taxes of any member may be remitted by vote of the House of Delegates upon recommendation of any County Medical Association.

Sec. 2. Any person who is under sentence of suspension or expulsion from a component association, or whose name has been dropped from its roll of members, shall not be entitled to any of the rights or benefits of the Society, nor shall he be permitted to take part in any of its proceedings until he has been relieved of such disability.

Sec. 3. Each member in attendance at the annual session shall enter his name on the registration book, indicating the component association of which he is a member.

CHAPTER III.—HOUSE OF DELEGATES.

Section 1. The House of Delegates shall be the legislative and business body of the Society, and shall consist of (1) delegates elected by the component county associations; (2)

the Councilors : and (3) ex officio, the President and Secretary of this Society.

Sec. 2. The House of Delegates shall meet on the first day of the annual session. It may adjourn from time to time as may be necessary to complete its business, provided that its hours shall conflict as little as possible with the General Meetings. The order of business shall be arranged as a separate section of the programme.

Sec. 3. Each component association shall be entitled to send to the House of Delegates each year, one delegate for every thirty-five members, or any part of that number.

Sec. 4. Fifteen delegates shall constitute a quorum.

Sec. 5. It shall, through its officers, Council, and otherwise, give diligent attention to and foster the scientific work and spirit of the Society, and shall constantly strive to make each annual session a stepping-stone to further advancement.

Sec. 6. It shall consider and advise as to the material interests of the profession, and of the public in those important matters wherein it is dependent upon the profession, and shall use its influence to secure and enforce all proper medical and public health legislation, and to diffuse popular information in relation thereto.

Sec. 7. It shall make careful inquiry into the condition of the profession of each county in the State, and shall have authority to adopt such methods as may be deemed most efficient for building up and increasing the interests in such county associations as already exist and for organizing the profession in counties where associations do not exist. It shall especially and systematically endeavor to promote friendly intercourse among physicians of the same locality, and shall continue these efforts until every physician in every county of the State who can be made reputable has been brought under medical society influence.

Sec. 8. It shall encourage post-graduate and research work, as well as home study, and shall endeavor to have the results discussed and utilized.

Sec. 9. It shall elect representatives to the House of Delegates of the American Medical Association in accordance with the Constitution and By-Laws of that body.

Sec. 10. It shall have authority to appoint committees for special purposes from among members of the Society who are not members of the House of Delegates.

Such committees shall report to the House of Delegates, and may be present and participate in the debate on their reports.

Sec. 11. It shall approve all memorials and resolutions issued in the name of the Society before the same shall become effective.

Sec. 12. Sections and District Societies. The House of Delegates may provide for a division of the scientific work of the Society into appropriate sections, and for the organization of such Councilor District Associations as will promote the best interests of the profession, such associations to be composed exclusively of members of component county associations.

CHAPTER IV.—SESSIONS AND MEETINGS.

Section 1. The Society shall hold an annual session, during which there shall be held daily General Meetings which shall be open to all registered members, guests and honorary members.

Sec. 2. The time and place for holding each annual session shall be fixed by the House of Delegates.

Sec. 3. Special meetings of either the Society or the House of Delegates shall be called by the President, on petition of ten (10) delegates or fifty (50) members.

Sec. 4. General Meetings. All registered members may attend and participate in the proceedings and discussions of the General Meetings and of the Sections. The General Meetings shall be presided over by the President or by one of the Vice Presidents, and before them shall be delivered the address of the President and the orations.

Sec. 5. The General Meeting may recommend to the House of Delegates the appointment of committees or com-

missions for scientific investigation of special interest and importance to the profession and the public.

CHAPTER V.—OFFICERS.

Section 1. The officers of this Society shall be a President, two Vice Presidents, a Secretary, a Treasury, and eight Councilors.

Sec. 2. The officers, except the Councilors, shall be elected annually. The first Councilors shall be appointed by the President, one from each county, who shall serve for one year, or until their successors shall be elected. At their annual meetings in the year 1906, each affiliated county medical association shall elect one councilor, of whom those elected in Hartford, New London, Windham, and Middlesex counties shall serve for one year, and those elected in New Haven, Fairfield, Litchfield, and Tolland counties shall serve for two years, and at the expiration of the term of office of the councilors so elected, each affiliated county medical association shall, biennially, elect a councilor, who shall serve for two years.

Sec. 3. All elections shall be by ballot, and a majority of the votes cast shall be necessary to elect.

Sec. 4. The election of officers shall be the first order of business of the House of Delegates after the reading of the minutes on the morning of the last day of the General Session, but no delegates shall be eligible to any office named in the preceding section, except that of councilor, and no person shall be elected to any such office who has not been a member of the Society for the past two years.

CHAPTER VI.—DUTIES OF OFFICERS.

Section 1. The President shall preside at all meetings of the Society and of the House of Delegates; shall appoint all committees not otherwise provided for; he shall deliver an annual address at such time as may be arranged, and perform such other duties as custom and parliamentary usage

may require. He shall be the real head of the profession of the State during his term of office and, as far as practicable, shall visit by appointment the various sections of the State and assist the Councilors in building up the county associations and in making their work more practical and useful.

Sec. 2. The Vice Presidents shall assist the President in the discharge of his duties. In the event of the President's death, resignation, or removal, the Council shall select one of the Vice Presidents to succeed him.

Sec. 3. The Treasurer shall give bond in the sum of \$1,000, the manner of bonding to be left to the Council. He shall demand and receive all funds due the Society, together with the bequests and donations. He shall pay money out of the treasury only on a written order of the President, countersigned by the Secretary; he shall subject his accounts to such examination as the House of Delegates may order, and he shall annually render an account of his doings and of the state of the funds in his hands.

Sec. 4. The Secretary shall attend the General Meetings of the Society and the meetings of the House of Delegates, and shall keep minutes of their respective proceedings in separate record books. He shall be ex-officio Secretary of the Council. He shall be custodian of all record books and papers belonging to the Society, except such as properly belong to the Treasurer, and shall keep account of and promptly turn over to the Treasurer all funds of the Society which come into his hands. He shall provide for the registration of the members and delegates of the annual sessions. He shall, with the cooperation of the secretaries of the component associations, keep a card-index register of all the legal practitioners of the State by counties, noting on each his status in relation to his county association, and, on request, shall transmit a copy of this list to the American Medical Association. He shall aid the Councilors in the organization and improvement of the county associations and in the extension of the power and usefulness of this Society. He shall conduct the

official correspondence notifying members of meetings, officers of their election, and committees of their appointment and duties. He shall employ such assistants as may be ordered by the House of Delegates, and shall make an annual report to the House of Delegates. He shall supply each component association with the necessary blanks for making their annual reports. Acting with the Committee on Scientific Work, he shall prepare and issue all programmes. The amount of his salary shall be fixed by the Council.

CHAPTER VII.—COUNCIL.

Section 1. The Council shall consist of one Councilor from each county and the President and Secretary *ex officio*. It shall be the Finance Committee of the House of Delegates. Five Councilors shall constitute a quorum.

Sec. 2. The Council shall meet daily during the session, and at such other times as necessity may require, subject to the call of the chairman or on petition of three Councilors. It shall meet on the last day of the annual session of the Society to organize and outline work for the ensuing year. It shall elect a chairman and a clerk, who, in the absence of the Secretary of the Society, shall keep a record of its proceedings. It shall, through its chairman, make an annual report to the House of Delegates.

Sec. 3. The Board of Councilors shall constitute the nominating committee of the Society. They shall report as such to the House of Delegates on the first day of the general session. After the report has been submitted an opportunity shall be given for other nominations to be made.

Sec. 4. Each Councilor shall be organizer, peacemaker, and censor for his district. He shall visit the counties in his district at least once a year for the purpose of organizing component associations where none exist; for inquiring into the condition of the profession, and for improving and increasing the zeal of the county associations and their members. He shall make an annual report of his work and of the condi-

tion of the profession of each county in his district at the annual session of the House of Delegates.

Sec. 5. The Council shall be the Board of Censors of the Society. It shall consider all questions involving the rights and standing of members, whether in relation to other members, to the component associations, or to this Society. All questions of an ethical nature brought before the House of Delegates or the General Meeting shall be referred to the Council without discussion. It shall hear and decide all questions of discipline affecting the conduct of members or component associations on which an appeal is taken from the decision of an individual Councilor, and its decision in all such matters shall be final.

Sec. 6. The Council shall provide for and superintend the publication and distribution of all proceedings, transactions, and memoirs of the Society, and shall have authority to appoint an editor and such assistants as it deems necessary. All money received by the Council and its agents, resulting from the discharge of the duties assigned to them, must be paid to the Treasurer of the Society. As the Finance Committee, it shall annually audit the accounts of the Treasurer and Secretary and other agents of this Society, and present a statement of the same in its annual report to the House of Delegates, which report shall also specify the character and cost of all the publications of this Society during the year, and the amount of all other property belonging to the Society under its control, with such suggestions as it may deem necessary. In the event of a vacancy in the office of the Secretary or the Treasurer, the Council shall fill the vacancy until the next annual election.

CHAPTER VIII.—COMMITTEES.

Section 1. The standing committees shall be as follows:

A Committee on Scientific Work.

A Committee on Public Policy and Legislation.

A Committee on Medical Examination and Medical Education.

A Committee on Honorary Members and Degrees.

A Committee on Arrangements, and such other committees as may be necessary. Such committees shall be elected by the House of Delegates unless otherwise provided.

Sec. 2. The Committee on Scientific Work shall consist of three members, of which the Secretary shall be one, and shall determine the character and scope of the scientific proceedings of the Society for each session, subject to the instructions of the House of Delegates. Fifteen days previous to each annual session it shall prepare and issue a programme announcing the order in which papers, discussions and other business shall be presented.

Sec. 3. The Committee on Public Policy and Legislation shall consist of one member from each component association, and the President and Secretary. Under the direction of the House of Delegates it shall represent the Society in securing and enforcing legislation in the interest of the public health and scientific medicine. It shall keep in touch with professional and public opinion, shall endeavor to shape legislation so as to secure the best results for the whole people, and shall strive to organize professional influence so as to promote the general good of the community in local, state, and national affairs and elections.

Sec. 4. The Committee on Medical Examination and Medical Education shall consist of five members, who shall be appointed in accordance with Sec. 4717 of the general statutes of the State of Connecticut. The committee shall conduct the medical examination of candidates for certificates of qualifications for license to practice medicine in the State in accord with the requirements of the Medical Practice Act. It shall annually present a written report to the House of Delegates. The committee shall also be a committee on medical education and shall coöperate with the council of education of the American Medical Association in the effort to elevate the standard of medical education in the United States.

Sec. 5. The Committee on Honorary Members and Degrees shall present annually to the House of Delegates the names of not more than three eminent physicians, not

residents of this state, as candidates for honorary membership in this Society. Such candidates may be elected honorary members in accordance with the provisions of Chap. I, Sec. 8, of the By-Laws.

Sec. 6. The Committee of Arrangements shall be appointed by the component association in which the annual session is to be held. It shall provide suitable accommodations for the meeting places of the Society and of the House of Delegates, and of their respective committees. Its chairman shall report an outline of the arrangements to the Secretary for publication in the programme, and shall make additional announcements during the session as occasion may require.

CHAPTER IX.—RECIPROCITY OF MEMBERSHIP WITH OTHER STATE SOCIETIES.

In order to broaden professional fellowship, this Society is ready to arrange with other State Medical Societies for an interchange of certificates of membership, so that members moving from one State to another may avoid the formality of re-election.

CHAPTER X.—FUNDS AND EXPENSES.

Funds shall be raised by an equal per capita assessment on each component association. The amount of the annual assessment per member shall be fixed by the House of Delegates.

Funds may also be raised by voluntary contributions, for the Society's publications, and in any other manner approved by the House of Delegates. Funds may be appropriated by the House of Delegates to defray the expenses of the Society, for publications, and for such other purposes as will promote the welfare of the profession. All resolutions appropriating funds must be referred to the Finance Committee before action is taken thereon.

CHAPTER XI.—REFERENDUM.

Section 1. A General Meeting of the Society may, by a two-thirds vote of the members present, order a general

referendum on any question pending before the House of Delegates, and when so ordered the House of Delegates shall submit such question to the members of the Society, who may vote by mail or in person, and, if the members voting shall comprise a majority of all the members of the Society, a majority of such vote shall determine the question and be binding on the House of Delegates.

Sec. 2. The House of Delegates may, by a two-thirds vote of its members present, submit any question before it to a general referendum, as provided in the preceding section, and the result shall be binding on the House of Delegates.

CHAPTER XII.—COUNTY ASSOCIATIONS.

Section 1. All County Associations now in affiliation with the Connecticut Medical Society shall be component parts of this Society.

Sec. 2. Each County Association shall judge of the qualification of its members, but as such associations are the only portals to this Society and to the American Medical Association, all reputable and legally registered physicians, except those who practice or claim to practice or lend support to any exclusive or irregular system of medicine, shall be entitled to membership.

No physician shall be admitted to or retain membership in a County Medical Association after the expiration of his present contract who has agreed to furnish medical services to any organization or union for a stipulated sum per member, or for other consideration than the regular local fee for such services.

Sec. 3. Any County Medical Association may suspend or expel any member who is guilty of improper or unprofessional conduct, by a two-thirds vote of the members present and voting at any regular meeting, provided due notice has been given on the programme of said meeting at least ten days before its session. When from any cause a member of the Connecticut State Medical Society ceases to be a member of one of the component county medical associations, his member-

ship in the Connecticut State Medical Society shall terminate, but any physician who may feel aggrieved by the action of the association of his county in refusing him membership or in suspending or expelling him, shall have the right to appeal to the Council, and its decision shall be final.

Sec. 4. In hearing appeals the Council may admit oral or written evidence as in its judgment will be best and to most fairly present the facts, but in case of every appeal, both as a Board and as individual councilors in district and county work, efforts at conciliation and compromise shall precede all such hearings.

Sec. 5. When a member in good standing in a component association moves to another county in this State, his name, on request, shall be transferred, without cost, to the roster of the county into whose jurisdiction he moves.

Sec. 6. A physician living on or near a county line may hold his membership in that county most convenient for him to attend, on permission of the association in whose jurisdiction he resides.

Sec. 7. Each component association shall have general direction of the affairs of the profession in its county, and its influence shall be constantly exerted for bettering the scientific, moral, and material condition of every physician in the county; and systematic efforts shall be made by each member, and by the Society as a whole, to increase the membership until it embraces every qualified physician in the county.

Sec. 8. At some meeting in advance of the annual session of this Society, each county association shall elect a delegate or delegates to represent it in the House of Delegates of this Society in the proportion of one delegate to each thirty-five members, or any part of that number, and the Secretary of the Association shall send a list of such delegates to the Secretary of this Society at least twenty days before the annual session.

In the case of death, illness or disability of a Councilor or delegate, the President of the County Association, in which the vacancy occurs, shall appoint a substitute Councilor or

delegate, with full power to represent his county during the Councilor's or delegate's disability, or until the successor of such appointee is elected at the next meeting of the County Medical Association.

Sec. 9. The Secretary of each component association shall keep a roster of its members and of the non-affiliated registered physicians of the county, in which shall be shown the full name, address, college and date of graduation, date of registration in this State, and such other information as may be deemed necessary. In keeping such roster the Secretary shall note any changes in the personnel of the profession by death, or by removal to or from the county, and in making his annual report he shall be certain to account for every physician who has lived in the county during the year.

Sec. 10. The Secretary of each component association shall forward its assessment to the Treasurer at last ten days before the annual session, and its roster of officers and list of non-affiliated physicians of the county to the Secretary of this Society each year twenty days before the annual session.

Sec. 11. The several county medical associations shall have power to adjourn; to call special meetings, as they shall deem expedient; and to adopt such by-laws as they find desirable, not contrary to the laws of this State or the charter and by-laws of the Connecticut State Medical Society.

CHAPTER XIII.—MISCELLANEOUS.

Section 1. No address or paper before this Society, except those of the President and orators, shall occupy more than twenty minutes in its delivery; and no member shall speak longer than five minutes, nor more than once on any subject except by unanimous consent.

Sec. 2. All papers read before the Society or any of the Sections shall become its property. Each paper shall be deposited with the Secretary when read. No paper shall be read before this Society which has been previously published or read before any other organization.

Sec. 3. The deliberations of this Society shall be governed by parliamentary usage as contained in Roberts' Rules of Order, when not in conflict with the charter and by-laws.

Sec. 4. The Principles of Medical Ethics of the American Medical Association shall govern the conduct of members in their relations to each other and to the public.

CHAPTER XIV.—AMENDMENTS.

These By-Laws may be amended at any annual session by a majority vote of all delegates present at that session, after the amendment has been laid on the table until the next annual session. If, however, the proposed alteration has been published in the notice of the session, it may be acted upon after it has laid on the table one day.

MEMBERS OF THE CONNEC-
TICUT STATE MEDICAL
SOCIETY.

MEMBERS OF THE SOCIETY.

HONORARY MEMBERS.

WILLIAM MCCOLLOM.....	Brooklyn, N. Y.
AGRIPPA NELSON BELL.....	Brooklyn, N. Y.
JOHN SHAW BILLINGS.....	New York City, N. Y.
THOMAS ADDIS EMMETT	New York City, N. Y.
WILLIAM HENRY WELCH.....	Baltimore, Md.
ROBERT FULTON WEIR.....	New York City, N. Y.
SIR JOSEPH LISTER.....	London, England.
EDWARD G. JANEWAY.....	New York City, N. Y.
HON. CHARLES E. GROSS.....	Hartford, Conn.
DAVID WEBSTER.....	New York City, N. Y.
SIR JAMES GRANT.....	Ottawa, Canada.
HENRY O. MARCY.....	Boston, Mass.
T. MITCHELL PRUDDEN.....	New York City, N. Y.
WILLIAM W. KEEN.....	Philadelphia, Penn.
JAMES W. McLANE.....	New York City, N. Y.
FREDERICK HOLME WIGGIN.....	New York City, N. Y.
J. W. S. GOULEY.....	New York City, N. Y.
REYNOLD WEBB WILCOX.....	New York City, N. Y.
WILLIAM OSLER.....	Oxford, England.
GEORGE M. STERNBERG.....	Washington, D. C.
FRANCIS DELAFIELD.....	New York City, N. Y.
MAURICE H. RICHARDSON.....	Boston, Mass.

ACTIVE MEMBERS.

The names of those who have been Presidents are in capitals.

HARTFORD COUNTY.

CHARLES M. WOOSTER, M.D., Tariffville, *President*.

CHARLES D. ALTON, M.D., Hartford, *Vice President*.

*FREDERICK B. WILLARD, M.D., Hartford, *Secretary and Treasurer*.

Councilor—OLIVER C. SMITH, M.D., Hartford.

Censors—THOMAS F. KANE, M.D. WALTER G. MURPHY, M.D.

EDWARD G. FOX, M.D.

Annual Meeting, First Tuesday in April; Semi-Annual Meeting,
Fourth Tuesday in October.

Hartford:

Horace S. Fuller.....	253 Trumbull Street.
Nathan Mayer.....	904 Main Street.
David Crary, Jr.	926 Main Street.
John B. Lewis.....	700 Main Street.
Gustavus P. Davis.....	700 Main Street.
Charles E. Froelich.....	125 Oakland Terrace.
Harmon G. Howe.....	137 High Street.
William W. Knight.....	254 Trumbull Street.
Thomas D. Crothers.....	50 Fairfield Avenue.
George L. Parmele.....	36 Pearl Street.
Ellen H. Gladwin.....	705 Asylum Avenue.
SAMUEL B. ST. JOHN.....	68 Pratt Street.
Frederick S. Crossfield.....	75 Pratt Street.
Marcus M. Johnson.....	122 Woodland Street.
William D. Morgan.....	49 Pearl Street.
John F. Axtelle.....	635 Main Street.
George K. Welch.....	103 Pratt Street.
Phineas H. Ingalls.....	49 Pearl Street.
Edward K. Root.....	49 Pearl Street.

* Exempted from taxation.

John Howard.....	391	Trumbull Street.
Charles D. Alton.....	86	Farmington Avenue.
Oliver C. Smith.....	44	High Street.
Joseph E. Root.....	67	Pearl Street.
William Porter, Jr.....	179	Allyn Street.
Frederick T. Simpson.....	122	High Street.
George R. Miller.....	51	Church Street.
Charles C. Beach.....	125	Trumbull Street.
Gideon C. Segur.....	67	Farmington Avenue.
George C. Bailey.....	85	Church Street.
Alva E. Abrams.....	36	Pearl Street.
Charles E. Taft.....	98	High Street.
Thomas F. Kane.....	517	Main Street.
Arthur J. Wolff.....	904	Main Street.
Ansel G. Cook.....	179	Allyn Street.
Edwin A. Down.....	902	Main Street.
Daniel F. Sullivan.....	64	Church Street.
Joseph H. Cahill.....	1145	Main Street.
EVERETT J. MC KNIGHT.....	110	High Street.
Benjamin S. Barrows.....	189	High Street.
Michael A. Bailey.....	434	Main Street.
George N. Bell.....	44	High Street.
Frank L. Waite.....	68	Pratt Street.
Charles S. Stern.....	75	Pratt Street.
Oliver K. Isham.....	211	High Street.
Franklin L. Lawton.....	295	Main Street.
John H. Rose.....	75	Pratt Street.
John B. Waters.....	281	Trumbull Street.
Joseph B. Hall.....	10	Garden Street.
Edward A. Elmer.....	805	Park Street.
Janet M. Weir.....	282	Sigourney Street.
John F. Dowling.....	1315	Main Street.
Philip D. Bunce.....	98	High Street.
Wilton E. Dickerman.....	125	Trumbull Street.
John B. Boucher.....	25	Charter Oak Avenue.
Levi B. Cochran.....	43	Farmington Avenue.
James H. Naylor.....	3	Main Street.
Charles P. Botsford.....	1337	Main Street.
James H. Standish.....	340	Windsor Avenue.
Michael H. Gill.....	36	Pearl Street.
John B. McCook.....	390	Main Street.
John W. Felty.....	902	Main Street.
George E. Sleeper.....	1333	Main Street.
Thomas W. Chester.....	110	High Street.

Joseph A. Kilbourn.....	271	Park Street.
Thomas B. Enders.....	3	Highland Street.
Charles A. Goodrich.....	5	Haynes Street.
Alfred M. Rowley.....	53	Main Street.
Irving DeL. Blanchard.....	73	Windsor Avenue.
Emil G. Reinert.....	109	Ann Street.
Heman A. Tyler, Jr.....	686	Main Street.
Frederick L. McKee.....	92	Pearl Street.
Edward R. Lampson.....	125	Trumbull Street.
E. Terry Smith.....	36	Pearl Street.
William H. Fitzgerald.....	904	Main Street.
Emma J. Thompson.....	287	Trumbull Street.
Patrick J. Ryan.....	316	Park Street.
Walter R. Steiner.....	4	Trinity Street.
Ellen P. O'Flaherty.....	140	Main Street.
Marian W. Williams.....	748	Asylum Street.
Allen H. Williams.....	904	Main Street.
C. Brewster Brainard.....	904	Main Street.
Eckley R. Storrs.....	179	Allyn Street.
Ernest A. Wells.....	2	Garden Street.
William H. Van Strander.....	73	Church Street.
James W. Conklin.....	89	Pratt Street.
Orin R. Witter.....	44	High Street.
Michael R. Laden.....	11	Buckingham Street.
*Frederick Buell Willard.....	80	Church Street.
Francis Arthur Emmet.....	1295	Main Street.
Henry Ely Adams.....	194	High Street.
William T. Owens.....	397	Capitol Avenue.
John C. Pierson.....	50	Windsor Avenue.
Henry F. Stoll.....	75	Pratt Street.
Paul B. Swett.....	179	Allyn Street.
Charles J. Fox.....	36	Pearl Street.
Mark S. Bradley.....	36	Pearl Street.
Harry C. Clifton.....	242	Sigourney Street.
Robert S. Starr.....	75	Pratt Street.
Arthur C. Heublein.....	110	High Street.
Whitefield N. Thompson.....	30	Washington Street.
Annabella K. Davenport.....	38	Collins Street.
Maude W. Taylor.....	75	Pratt Street.
Joseph J. Boucher.....	247	Park Street.
Isaac W. Kingsbury.....	36	Pearl Street.
Edward J. Turbett.....	18	New Park Avenue.

* Exempted from taxation.

Patrick F. McPartland.....	1341 Main Street.
Thomas F. Welch.....	356 Windsor Avenue.
James F. Wilson.....	164 High Street.
Robert L. Rowley.....	904 Main Street.
William H. Crowley.....	15 Charter Oak Avenue.
Horace C. Swan.....	11 Lincoln Street.
Frank J. Ronayne.....	St. Mary's Home.
Otto G. Wiedman.....	377 Albany Avenue.
Thomas N. Hepburn.....	42 High Street.
Henry A. Martelle.....	110 High Street.
Charles T. Beach.....	686 Main Street.
Edward H. Blair.....	389 Main Street.
James W. Ward.....	437 Capitol Avenue.
George F. Vail.....	36 Pearl Street.
Clarence M. Hatheway.....	110 High Street.
Albert R. Keith.....	468 Washington Street.
Joseph P. Ryan.....	44 Church Street.
Arthur H. Griswold.....	108 Church Street.
David J. Molumphy.....	417 Main Street.
Morris Tuch.....	16 Village Street.
Edward R. Hotchkiss.....	116 Ann Street.
John Bagg Griggs.....	772 Asylum Avenue.
Andrew Mansergh Outerson.....	104 Church Street.
Charles Herbert Borden.....	36 Pearl Street.
James Francis Rooney.....	308 Park Street.
Hugh Francis Flaherty.....	305 Park Street.
George Arthur Smith.....	158 High Street.
Henry Bickford.....	111 Ann Street.
Paul Waterman.....	148 High Street.
William Bradford Bartlett.....	148 High Street.
Howard Bulkley Haylett.....	179 Allyn Street.
Domenico DeBonis.....	94 Windsor Avenue.

Berlin—EAST BERLIN :

Thomas C. Hodgson.

Bristol:

William W. Horton.
 Arthur S. Brackett.
 William M. Curtis.
 Herbert D. Brennan.
 Timothy G. O'Connell.
 Benedict N. Whipple.

Canton—COLLINSVILLE :

George F. Lewis.
 Paul Plummer.
 Ralph B. Cox.
 Sheldon S. T. Campbell.

East Hartford:

Thomas S. O'Connell.
 Walter G. Murphy.
 Franklin H. Mayberry.

East Windsor—BROAD BROOK :

Howard O. Allen.
Harold S. Backus.

Enfield—THOMPSONVILLE :

Edward F. Parsons.
George T. Finch.
Henry G. Varno.
Michael J. Dowd.
John L. Bridge.
Thomas Grant Alcorn.

HAZARDVILLE :

Simon W. Houghton.

Farmington—Unionville :

Michael J. Morrissey.

Granby :

Rollin D. Chatfield.

Glastonbury :

Charles G. Rankin.
William S. Kingsbury.

SOUTH GLASTONBURY :

Henry M. Rising.
Harry B. Rising.

KENSINGTON :

Charles B. Chedel.

Manchester :

Francis H. Whiton.
Calvin Weidner.
Harry R. Sharpe.

SOUTH MANCHESTER :

William R. Tinker.
Thomas H. Weldon.
William S. Gillman.
Noah A. Burr.
Thomas G. Sloan.
John L. North.
George W. May.

New Britain :

*George Clary.
*Jay S. Stone.
Erastus P. Swasey.
*Michael J. Coholan.
Lawrence M. Cremin.
Samuel W. Irving.
Robert M. Clark.
Hermann Strosser.
Arvid Anderson.
Kenneth E. Kellogg.
Edward L. Whittemore.
Thomas E. Reeks.
William W. Brackett.
Ernst T. Fromen.
Catherine H. Travis.
Theodore G. Wright.
Charles A. Gillin.
Julius Hupert.
Joseph H. Potts.
Maurice W. Maloney.
John Purney.
George Houghton Bodley.

Newington :

Julius E. Griswold.

Plainville :

John N. Bull.

Rocky Hill :

Orran A. Moser.

Simsbury :

John P. Carver.

TARIFFVILLE :

Charles M. Wooster.

Southington :

Willard G. Steadman.
William R. Miller.

*Exempted from taxation.

South Windsor:

Mary S. Tudor.
Henry A. Deane.

Suffield:

William M. Stockwell.
Joseph A. Gibbs.
WEST SUFFIELD:
William E. Caldwell.

West Hartford:

Charles O. Purinton.
*Edwin B. Lyon.
Ralph W. E. Alcott.

Wethersfield:

Edward G. Fox.
Arthur W. Howard.
Felix P. Chillingworth.
Bartholomew F. Donahue.

Windsor:

Newton S. Bell.
Howard F. King.

Windsor Locks:

Joseph A. Coogan.
William J. Coyle.
Myron P. Robinson.
Richard A. Outerson.
Total Number, 224.

NEW HAVEN COUNTY.

NORTON R. HOTCHKISS, M.D., New Haven, *President*.
WILLIAM J. DELANEY, M.D., Naugatuck, *Vice President*.
*WILLIAM S. BARNES, M.D., New Haven, *Secretary*.
Councilor—CHARLES S. RODMAN, M.D., Waterbury.
Censors—CHARLES J. FOOTE, M.D., F. N. LOOMIS, M.D.,
SAMUEL D. OTIS, M.D.

Annual Meeting, Third Thursday in April; Semi-Annual, Third
Thursday in October.

New Haven:

John Nicoll.....105 Sherman Avenue.
FRANCIS BACON.....32 High Street.
A. E. Winchell.....60 Pearl Street.
Arthur Ruickoldt.....71 Olive Street.
Frederick Bellosa.....209 Orange Street.
S. D. Gilbert.....27 Wall Street.
J. P. C. Foster.....109 College Street.
W. H. CARMALT.....87 Elm Street.
T. H. Russell.....137 Elm Street.
F. H. Whittemore.....69 Elm Street.

*Exempted from taxation.

C. P. Lindsley.....	37 Elm Street.
H. Fleischner.....	928 Grand Avenue.
M. Mailhouse.....	45 Elm Street.
M. C. O'Connor.....	882 State Street.
Charles E. Park.....	42 Elm Street.
Gustavus Eliot.....	209 Church Street.
J. F. Stetson.....	106 High Street.
J. F. Luby.....	1210 Chapel Street.
William W. Hawkes.....	35 High Street.
Frank H. Wheeler.....	27 Perkins Street.
Herbert E. Smith	Medical College.
F. W. Wright.....	48 Pearl Street.
Edward K. Roberts.....	244 Grand Avenue.
Oliver T. Osborne.....	252 York Street.
Lucy C. Peckham.....	141 Greene Street.
William G. Daggett.....	189 Church Street.
Louis S. DeForest.....	335 Orange Street.
Henry L. Swain.....	232 York Street.
Mary B. Moody.....	Sherland Avenue, cor. E. Grand Avenue.
G. F. Converse.....	1 Whalley Avenue.
J. H. Townsend.....	62 Trumbull Street.
T. M. Cahill.....	40 Pearl Street.
C. J. Foote.....	26 Elm Street.
S. J. Maher.....	212 Orange Street.
Jay W. Seaver.....	25 Lynwood Place.
Louis B. Bishop.....	356 Orange Street.
H. W. Ring.....	187 Church Street.
W. C. Welch.....	44 College Street.
A. O. Baribault.....	209 Chapel Street.
Edward M. McCabe.....	278 Orange Street.
James M. Reilly.....	337 Cedar Street.
Clarence E. Skinner.....	331 Temple Street.
N. R. Hotchkiss.....	219 York Street.
Benjamin A. Cheney.....	404 Whitney Avenue.
Charles A. Tuttle.....	196 York Street.
Harry B. Ferris.....	395 St. Ronan Street.
Leonard W. Bacon, Jr.....	294 Elm Street.
Paul S. Robinson.....	164 Grand Avenue.
Arthur N. Alling.....	257 Church Street.
R. A. McDonnell.....	1142 Chapel Street.
E. P. Pitman.....	52 Sylvan Avenue.
Isaac N. Porter.....	198 Dixwell Avenue.
Ernest H. Arnold.....	46 York Square.
Robert E. Peck.....	56 Howe Street.
William C. Wurtenberg.....	28 Elm Street.

Frederick N. Sperry.....	33 College Street.
William F. Verdi.....	13 Elm Street.
Charles J. Bartlett.....	209 York Street.
Morris D. Slattery.....	566 Howard Avenue.
Ward H. Sanford.....	60 Edwards Street.
William M. Kenna.....	1161 Chapel Street.
Leonard C. Sanford.....	347 Temple Street.
Willis H. Crowe.....	106 Whalley Avenue.
Charles H. Robbins.....	326 Grand Avenue.
Louis M. Gompertz.....	1195 Chapel Street.
Alfred G. Nadler.....	377 Orange Street.
Frederick C. Bishop.....	1241 Chapel Street.
James H. J. Flynn.....	840 Howard Avenue.
William J. Sheehan.....	619 Howard Avenue.
John F. Sullivan.....	205 Blatchley Avenue.
Edward F. McIntosh.....	192 York Street.
Nicola Mariani.....	119 Greene Street.
James S. Maher.....	215 Orange Street.
Percy D. Littlejohn.....	193 York Street.
A. W. Marsh.....	1012 Whalley Avenue.
William N. Winne.....	1020 Whalley Avenue.
*William S. Barnes.....	526 Howard Avenue.
Clarence L. Kilbourn.....	202 Blatchley Avenue.
Henry H. Smith.....	43 Elm Street.
Julia E. Teele.....	206 Hamilton Street.
Harry L. Welch.....	44 College Street.
Otto G. Ramsay.....	251 Church Street.
Thomas V. Hynes.....	27 College Street.
Harry M. Steele.....	226 Church Street.
Willis E. Hartshorn.....	1138 Chapel Street.
Richard F. Rand.....	246 Church Street.
Edward S. Moulton.....	204 York Street.
Timothy Francis Cohane.....	600 Howard Avenue.
William James Butler.....	712 Howard Avenue.
David Bercinsky.....	360 George Street.
Louis A. Notkins.....	700 Howard Avenue.
Francis H. Reilly.....	296 Columbus Avenue.
Nelson A. Ludington.....	96 Park Street.
Dwight M. Lewis.....	193 York Street.
Seymour L. Spier.....	348 Crown Street.
William H. Bean.....	252 York Street.
E. Reed Whittemore.....	69 Elm Street.
John E. Lane.....	203 York Street.

*Exempted from taxation.

Alice P. Ford.....	1302 Chapel Street.
Francis N. Boynton.....	46 York Square.
Carl W. Henze.....	22 Trumbull Street.
Eugene M. Blake.....	257 Church Street.
George Blumer.....	204 York Street.
Archibald C. Herbert.....	226 York Street.
Mary P. Dole.....	15 Elm Street.
Harold S. Arnold.....	199 York Street.
Frederick P. Lane.....	524 Chapel Street.
Allen R. Diefendorf.....	199 York Street.
William J. Barrett.....	63 Olive Street.
Herman P. Hessler.....	323 George Street.
Benjamin L. Lambert.....	578 Howard Avenue.
Rollin McNeil.....	145 Bradley Street.
Samuel M. Hammond.....	105 College Street.
Archibald McNeil.....	51 Livingston Street.
Willard F. Allen.....	65 Dixwell Avenue.
Frederick G. Beck.....	199 York Street.
Raynham Townshend.....	233 Church Street.
Jeremiah J. Cohane.....	342 Grand Avenue.
Frank L. Phillips.....	196 York Street.
Charles Fitzgerald.....	220 Orange Street.

Ansonia:

Louis E. Cooper.
 Louis H. Wilmot.
 Edward K. Parmelee.
 Burton I. Toles.

Branford:

C. W. Gaylord.
 A. J. Tenney.

Cheshire:

Edward W. Karrman.

Derby:

F. N. Loomis.
 Royal W. Pinney.
 Edward O'R. Maguire.
 Elmer T. Shippe.
 Frank A. Elmes.
 Stephen S. Donovan.

East Haven:

Charles W. Holbrook.

Guilford:

George H. Beebe.
 Redfield B. West.

Hamden:

Walter S. Lay.

MOUNT CARMEL:

George H. Joslin.

Madison:

John M. Shepard.
 Milo P. Ringe.

Meriden:

*N. Nickerson.
 A. W. Tracey.
 E. T. Bradstreet.
 J. D. Eggleston.

*Exempted from taxation.

Edward W. Smith.
 Ava H. Fenn.
 E. W. Pierce.
 S. D. Otis.
 F. P. Griswold.
 E. D. Hall.
 H. W. Delesdernier.
 H. A. Meeks.
 J. W. H. La Pointe.
 Joseph A. Cooke.
 Albert E. Von Tobel.
 Louis F. Wheatley.
 Michael J. Sullivan.
 Howard deF. Lockwood.
 Addison J. Tanner.

Milford:

E. C. Beach.
 John Ives.
 Dean C. Bangs.

Naugatuck:

Thomas M. Bull.
 James W. Robbins.
 William J. Delaney.
 Edwin H. Johnson.
 John J. Carroll.

North Haven:

Gould S. Higgins.

Orange—WEST HAVEN:

J. F. Barnett.
 Charles D. Phelps.
 Victor A. Kowalewski.
 John S. Gilmore.

Seymour:

Frank A. Benedict.
 Elias W. Davis.

Wallingford:

J. D. McGaughey.
 William S. Russell.

William P. Wilson.
 Caroline North.
 David R. Lyman.
 Irving E. Brainard.
 John H. Buffum.

Waterbury:

F. E. Castle.
 Walter L. Barber.
 CHARLES S. RODMAN.
 J. M. Benedict.
 Carl E. Munger.
 Bernard A. O'Hara.
 John F. Hayes.
 Augustin A. Crane.
 Patrick T. O'Connor.
 John D. Frenay.
 Charles A. Hamilton.
 George O. Robbins.
 Charles H. Brown.
 Edward W. Goodenough.
 Myron L. Cooley.
 Frederick G. Graves.
 James L. Moriarty.
 George W. Russell.
 Daniel L. Maloney.
 Thomas J. Kilmartin.
 Charles A. Monagan.
 Henry E. Hungerford.
 Nelson A. Pomeroy.
 Patrick J. Dwyer.
 Louis J. Thibault.
 William A. Goodrich.
 John E. Farrell.
 Charles Engelke.
 Thomas J. McLarny.
 Dudley B. Deming.
 Andrew C. Swenson.
 James J. McLinden.
 Thomas E. Parker.
 Elizabeth C. Spencer.
 Michael J. Donahue.
 Egbert L. Smith.
 John L. Dillon.

Waterbury—cont'd.

John J. Gailey.
Isabel Cowan.
Arthur Variell.
Aletta L. Bedford.

Theodore F. Bevans.
Chas. W. S. Frost.
Arthur F. McDonald.
Jacob Gancher.

Total Number, 226.

NEW LONDON COUNTY.

HARRY M. LEE, M.D., New London, *President*.

MORTON E. FOX, M.D., Uncasville, *Vice President*.

*EDWIN C. CHIPMAN, M.D., New London, *Secretary*.

Councilor—EDWARD P. BREWER, M.D., Norwich.

Censors—L. S. PADDOCK, M.D., WILLIAM WITTER, M.D.,
C. E. BRAYTON, M.D.

Annual Meeting, First Thursday in April; Semi-Annual, First
Thursday in October.

Colchester:

Raymond R. Gandy.

Lyme:

Ellis K. Devitt.
John L. Burnham.

East Lyme—NIANTIC:

Frederick H. Dart.
Edward Atkinson.

Griswold—JEWETT CITY:

George H. Jennings.
Alphonse Fontaine.

Groton:

Edmund P. Douglass.
Frank W. Hewes.

NOANK:

William M. Hill.

Montville—UNCASVILLE:

Morton E. Fox.

New London:

Abiel W. Nelson.
FRANCIS N. BRAMAN
John G. Stanton.
Charles B. Graves.
Harold H. Heyer.
Carlisle F. Ferrin.
Thomas W. Rogers.
J. Clifton Taylor.
Harry M. Lee.
Emanuel A. Henkle.
*Edward C. Chipman.
Gurdon S. Allyn.
Daniel Sullivan.
Joseph M. Ganey.
James L. Harrington.
William D. Cronin.
Henry A. Rogers.
Ernest O. Winship.
Stuart J. Lawson.
Frank M. Dunn.

*Exempted from taxation.

Norwich:

William Witter.
 William S. C. Perkins.
 Patrick Cassidy.
 LEONARD B. ALMY.
 Anthony Peck.
 Edward P. Brewer.
 Newton P. Smith.
 Witter K. Tingley.
 William T. Browne.
 Rush W. Kimball.
 James J. Donahue.
 Harry E. Higgins.
 Charles H. Perkins.
 Patrick H. Harriman.
 Dennis J. Shahan.
 Patrick J. Cassidy.
 Edward J. Brophy.
 Leone F. LaPierre.

TAFTVILLE:

George Thompson.

YANTIC:

Herbert H. Howe.

Stonington:

Charles E. Brayton.
 Norman L. Drake.
 George D. Stanton.

MYSTIC:

Frank A. Coates.
 Louis M. Allyn.
 William H. Gray.

OLD MYSTIC:

*Albert T. Chapman.

Waterford:

George M. Minor.
 William B. Casey.

Total Number, 61.

FAIRFIELD COUNTY.

D. CHESTER BROWN, M.D., Danbury, *President*.

SAMUEL PIERSON, M.D., Stamford, *Vice President*.

*FRANK W. STEVENS, M.D., Bridgeport, *Secretary*.

JAMES D. GOLD, M.D., Bridgeport, *Treasurer*.

Councilor—GOULD A. SHELTON, M.D., Shelton.

Censors—WILLIAM J. TRACEY, M.D., EDWARDS M. SMITH, M.D.,
 WILLIAM S. RANDALL, M.D.

Annual Meeting, Second Tuesday in April, at Bridgeport;
 Semi-Annual, Second Tuesday in October.

Bridgeport:

Andrew J. Smith.....191 Barnum Avenue.
 GEORGE L. PORTER.....372 State Street.
 Robert Lauder310 Fairfield Avenue.
 *N. E. WORDIN.....274 Fairfield Avenue.
 F. M. Wilson.....834-836 Myrtle Avenue.
 F. B. Downs.....906 Lafayette Street.
 J. W. Wright.....808-810-812 Myrtle Avenue.

*Exempted from taxation.

A. A. Holmes.....	991	Broad Street.
Charles C. Godfrey.....	340	State Street.
S. M. Garlick.....	474	State Street.
Henry Blodget.....	477	State Street.
J. C. Lynch.....	826	Myrtle Avenue.
C. C. Hoyt.....	1289	State Street.
G. W. Osborn.....	888	Broad Street.
J. R. Topping.....	349	Noble Avenue.
B. W. White.....	390	State Street.
Jacob May.....	816	North Avenue.
F. C. Graves.....	561	State Street.
G. B. Cowell.....	502	East Washington Avenue.
George E. Ober.....	391	Main Street.
D. C. DeWolfe.....	516	Fairfield Avenue.
Henry S. Miles.....	417	State Street.
Charles L. Banks.....	306	West Avenue.
Fessenden L. Day.....	477	State Street.
Edward Fitzgerald.....	526	East Washington Avenue.
George S. Ford.....	527	State Street.
Frank M. Tukey.....	429	State Street.
William W. Gray.....	346	West Avenue.
James D. Gold.....	839	Myrtle Avenue.
Reuben A. Lockhart.....	760	Washington Avenue.
Harriet A. Thompson.....	695	Warren Street.
Frederick J. Adams.....	327	Fairfield Avenue.
W. J. A. O'Hara.....	361	Barnum Avenue.
David M. Trecartin.....	860	Park Avenue.
Harry W. Fleck.....	421	State Street.
Thomas L. Ellis.....	332	West Avenue.
Charles R. Townsend.....	346	State Street.
Herbert E. Smyth.....	376	John Street.
J. Murray Johnson.....	385	State Street.
Elmer F. Blank.....	387	Noble Avenue.
Irving L. Nettleton.....	385	Noble Avenue.
Edwards M. Smith.....	340	State Street.
Frank L. Smith.....	2178	Main Street.
David B. Wason.....	311	State Street.
Thomas F. Stanton.....	374	State Street.
Dorland Smith.....	834	Myrtle Avenue.
*Frank W. Stevens.....	829	Myrtle Avenue.
George Howell Warner.....	429	State Street.
Daniel Michael Driscoll.....	467	State Street.
Chester E. Blackman.....	1119	Stratford Avenue.

*Exempted from taxation.

David H. Monahan.....	525 State Street.
George F. Sheedy.....	2059 Main Street.
Henry E. Waterhouse.....	430 State Street.
Robert J. Lynch.....	231 Fairfield Avenue.
Charles J. Leverty.....	469 State Street.
Philip W. Bill.....	534 Fairfield Avenue.
Louis Smirnow.....	323 State Street.
Albert J. Roberts.....	346 State Street.
F. Winthrop Pyle.....	808 Myrtle Avenue.
Eli B. Ives.....	469 State Street.
Frank H. Coops.....	411 State Street.
William C. Watson.....	446 Stratford Avenue.
Jacob W. Gerber.....	662 East Main Street.
Herman E. Schultz.....	475 State Street.
Nathan T. Pratt.....	1221 Stratford Avenue.
Charles H. Haskell.....	467 State Street.
Morris J. Greenstein.....	107 Barnum Avenue.
Philip J. Curran.....	475 State Street.
Grovanis Formietelli.....	48 Walter Street.
James L. Sullivan.....	539 East Main Street.
Robert B. Keen.....	18 N. Washington Avenue.
William C. Bowers.....	336 State Street.
Charles W. Gardner.....	449 State Street.
Charles Hany Sprague.....	810 Myrtle Avenue.
Daniel Cleveland Patterson.....	477 State Street.
Charles Reed Pratt.....	911 Lafayette Street.

Bethel:

A. E. Barber.
George DeWitt Wight.
Charles R. Hart.

Danbury:

E. A. Stratton.
W. S. Watson.
D. Chester Brown.
H. F. Brownlee.
Nathaniel Selleck.
George E. Lemmer.
*Charles F. Craig, U. S. A.
William F. Gordon.
William T. Bronson.

Richard M. English.
Paul U. Sunderland.

Darien:

George H. Noxon.

NOROTON:

M. W. Robinson.
Albert L. House.

So. NOROTON HEIGHTS:

Harold E. Hoyt.

Fairfield:

W. H. Donaldson.

GREENFIELD HILL:

M. V. B. Dunham.

*Exempted from taxation.

GREENS FARMS:

David W. McFarland.

SOUTHPORT:

Joseph L. Hetzel.

Greenwich:

Frank Terry Brooks.

Fritz C. Hyde.

William L. Griswold.

Alvin W. Klein.

John A. Clarke.

William Burke.

Harriet Baker Hyde.

Edward O. Parker.

Edward F. Ashley.

RIVERSIDE:

Charles Smith.

Huntington—SHELTON:

GOULD A. SHELTON.

William S. Randall.

Francis I. Nettleton.

Monroe—STEPNEY:

SETH HILL.

New Canaan:

Clarence H. Scoville.

Myre J. Brooks.

Edmund J. O'Shaughnessy.

Norwalk:

James G. Gregory.

R. L. Higgins.

S. H. Huntington.

William J. Tracey.

Arthur R. Turner.

Jesse M. Coburn.

Walter Hitchcock.

Ward S. Gregory.

EAST NORWALK:

Franklin G. Brown.

SOUTH NORWALK:

C. G. Bohannon.

Lauren M. Allen.

SOUTH NORWALK:

Henry C. Sherer.

Jean Dumortier.

Francis J. Burnell.

William H. Stowe.

EAST NORWALK:

Frederick B. Baker.

Redding:

Ernest H. Smith.

Ridgefield:

Russell W. Lowe.

Howard P. Mansfield.

William H. Allen.

Stamford:

A. M. Hurlbut.

Samuel Pierson.

A. N. Phillips.

F. Schavoir.

William B. Treadway.

Rosavelle G. Philip.

George Sherrill.

Watson E. Rice.

Frank M. Tiffany.

George R. Hertzberg.

John J. Cloonan.

Dean Foster.

Donald R. MacLean.

Frank H. Barnes.

John H. Staub.

Richard L. Bohannon.

John J. Ryle.

John F. Harrison.

William T. Godfrey.

Gilbert T. Smith.

Thomas J. Biggs.

Ralph W. Crane.

Stratford:

W. B. Cogswell.
G. F. Lewis.

Weston—LYONS PLAINS:

F. Gorham.

Westport:

F. Powers.
F. D. Ruland.
*L. H. Wheeler, U. S. A.

Total Number, 163.

WINDHAM COUNTY.

R. C. PAINE, M.D., Thompson, *President*.

JOHN WELDON, M.D., Willimantic, *Vice President*.

*JAMES L. GARDNER, M.D., Central Village, *Secretary*.

Councilor—FRANK E. GUILD, M.D., Windham.

Censors—JAMES L. GARDNER, M.D., GEORGE W. MAY, M.D.,
C. E. SIMMONS, M.D.

Annual Meeting, Third Thursday in April.

Brooklyn—WAUREGAN:

*A. H. Tanner.

Danielson:

RIENZI ROBINSON.
W. H. Judson.
James R. Shannon.
George M. Burroughs.

Killingly:

Ashael E. Darling.
Henry L. Hammond.
George Barnes.

EAST KILLINGLY:

Charles E. Hill.

Moosup:

Charles N. Allen.
W. W. Adams.

CENTRAL VILLAGE:

*James L. Gardner.

Plainfield:

Arthur A. Chase.

Pomfret:

S. B. OVERLOCK.

Putnam:

John B. Kent.
F. A. Morrell.
Omar LaRue.
Warren W. Foster.
Henry R. Lowe.
Marguerite J. Bullard.
Edward F. Perry.
Joseph N. Landry.

Thompson:

Robert C. Paine.
NORTH GROSVENORDALE:
Emilien Rock.

Windham:

F. E. Guild.

*Exempted from taxation.

Willimantic:

Frederick Rogers.
 T. R. Parker.
 John Weldon.
 R. C. White.
 Laura H. Hills.
 Joseph A. Girouard.
 Clarence E. Simonds.

Owen O'Neil.
 Charles H. Girard.
 J. H. Egbert.
 Louis I. Mason.
 W. P. Stuart Keating.

Woodstock—EAST WOODSTOCK:

Charles C. Gildersleeve.

Total Number, 37.

LITCHFIELD COUNTY.

IRVING L. HAMANT, M.D., Norfolk, *President*.

SALMON G. HOWD, M.D., Winsted, *Vice President*.

*FRANK H. LEE, M.D., Canaan, *Secretary*.

Councilor—EDWARD H. WELCH, M.D., West Winsted.

Censors—H. D. MOORE, M.D., C. I. PAGE, M.D., JOSIAH SWETT, M.D.

Annual Meeting, Fourth Tuesday in April; Semi-Annual, Second Tuesday in October.

Bethlehem:

Etta May Hadley-Judd.

Canaan—FALLS VILLAGE:

Albert E. Cobb.
 Francis S. Skiff.

Cornwall—WEST CORNWALL:

Joseph Robinson.
 Howard G. Stevens.

Goshen:

J. H. North.
 Noah S. Wadhams.

Litchfield:

J. T. Sedgwick.
 John L. Buel.
 Charles N. Warner.
 Charles I. Page.
 Lyman F. Phillips.

New Hartford:

Josiah Sweet.

New Milford:

George E. Staub.
 George H. Wright.

Norfolk:

John C. Kendall.
 I. L. Hamant.
 Lucius D. Bulkley.
 Frederick S. Dennis.
 Almon W. Pinney.

North Canaan—CANAAN:

Charles W. Camp.
 Frank H. Lee.
 John G. Adam.

*Exempted from taxation.

Plymouth—TERRYVILLE :

W. W. Wellington.
A. V. Stoughton.
Robert E. Harrington.

LAKEVILLE :

William Bissell.
George H. Knight.
William B. Bissell.
Ernest R. Pike.

Roxbury :

Louis J. Pons.

Sharon :

Clarence W. Bassett.
Jerome S. Chaffee.

Thomaston :

George D. Ferguson.
Robert Hazen.
Ralph S. Goodwin.
James H. Kane.

Torrington :

William L. Platt.
Thatcher S. Hanchett.
Elias Pratt.
Jerome S. Bissell.

James D. Hayes.
Abram J. Barker.
Charles H. Carlin.
*Sanford H. Wadhams.
H. D. Moore.
William J. Hogan.
Timothy M. Ryan.
Harry B. Hanchett.
George Streit.

Washington :

Frederic W. Wersebe.

Watertown :

Ernest K. Loveland.

Winchester—WINSTED :

Edward L. Pratt.
William S. Hulbert.
*Salmon G. Howd.
David D. Reidy.
Ernest R. Kelsey.
Edward H. Welch.
William S. Richards.

Woodbury—HOTCHKISSVILLE :

William G. Reynolds.
Total Number, 60.

MIDDLESEX COUNTY.

JAMES MURPHY, M.D., Middletown, *President*.

M. D. MURPHY, M.D., Middletown, *Vice President*.

*A. B. COLEBURN, M.D., Middletown, *Secretary*.

Councilor—FRANK K. HALLOCK, M.D., Cromwell.

Censors—C. H. HUBBARD, M.D., J. E. BAILEY, M.D., M. C. HAZEN, M.D.

Annual Meeting, Second Thursday in April ; Semi-Annual, Second Thursday in October.

Chatham—MIDDLE HADDAM :

George N. Lawson.

EAST HAMPTON :

Albert Field.
Frederick T. Fitch.

Chester :

Fred Sumner Smith.

Clinton :

David Austin Fox.

*Exempted from taxation.

Cromwell:

Frank K. Hallock.
Charles E. Bush.
Sydney H. Lord.

East Haddam:

M. W. Plumstead.

Essex:

Frederick Barton Bradeen.
Charles C. Davis.

Haddam:

Miner C. Hazen.
Felix P. Chillingworth.

Middlefield:

James G. Burr.

Middletown:

William E. Fisher.
Charles E. Stanley.
Henry S. Noble.
Michael D. Murphy.
John E. Bailey.
Arthur J. Campbell.
*Arthur B. Coleburn.
J. Francis Calef.
John E. Loveland.

Kate C. Mead.
Daniel A. Nolan.
John H. Mountain.
Charles B. Young.
Jessie W. Fisher.
James T. Mitchell.
James Henry Kingman.
Thomas Patrick Walsh.
James Murphy.
James M. Keniston.
Lewis Maitland.
Louis R. Brown.

Old Saybrook:

Calista V. Luther.
Irwin Granniss.

Portland:

Cushman A. Sears.
Frank E. Potter.
Dennis L. Glynn.

Saybrook—DEEP RIVER:

Howard T. French.
Arthur Pratt.

Westbrook:

John W. Parker, Jr.

Total Number, 43.

TOLLAND COUNTY.

JAMES STRETCH, M.D., Stafford, *President*.

ISAAC P. FISKE, M.D., Coventry, *Vice President*.

*ELI P. FLINT, M.D., Rockville, *Secretary*.

Councilor—THOMAS F. ROCKWELL, M.D., Rockville.

Censors—FREDERICK W. WALSH, M.D., CYRUS E. PENDLETON, M.D.,
FRANK L. SMITH, M.D.

Annual Meeting, Third Tuesday in April; Semi-Annual, Third
Tuesday in October.

Coventry:

Isaac P. Fiske.

SOUTH COVENTRY:

WILLIAM L. HIGGINS.

Ellington:

Edwin T. Davis.

Hebron:

*Cyrus H. Pendleton.
Cyrus E. Pendleton.

*Exempted from taxation.

Mansfield—MANSFIELD DEPOT:

Frederick E. Johnson.

MANSFIELD CENTER:

William E. Cramm.

Rockville:

Frederick Gilnack.

Thomas F. Rockwell.

*Eli P. Flint.

Thomas F. O'Loughlin.

Frederick W. Walsh.

Francis M. Dickinson.

Wright B. Bean.

Somers:

Alonzo L. Hurd.

Stafford—STAFFORD SPRINGS:

CRYUS B. NEWTON.

Frank L. Smith.

James Stretch.

John P. Hanley.

Tolland:

Willard N. Simmons.

Total Number, 20.

*Exempted from taxation.

**OFFICERS OF THE CONNECTICUT STATE MEDICAL
SOCIETY FROM ITS ORGANIZATION IN 1792
TO THE PRESENT TIME.***

PRESIDENTS.

1792	Leverett Hubbard.	1876	Ashbel W. Barrows.
1794	Eneas Munson.	1877	Robert Hubbard.
1801	James Potter.	1878	Charles M. Carleton.
1803	Thomas Mosley.	1879	Alfred R. Goodrich.
1804	Jeremiah West.	1880	Gideon L. Platt.
1807	John R. Watrous.	1881	William Deming.
1812	Mason F. Cogswell.	1882	William G. Brownson.
1822	Thomas Hubbard.	1883	Elisha B. Nye.
1827	Eli Todd.	1884	Benjamin N. Comings.
1829	John S. Peters.	1885	Elijah C. Kinney.
1832	William Buel.	1886	Thomas H. Hills.
1834	Thomas Miner.	1887	Francis Bacon.
1837	Silas Fuller.	1888	George L. Porter.
1841	Elijah Middlebrook.	1889	Orlando Brown.
1843	Luther Ticknor.	1890	Melancthon Storrs.
1846	Archibald Welch.	1891	Charles A. Lindsley.
1849	George Sumner.	1892	Cyrus B. Newton.
1851	Rufus Blakeman.	1893	Francis D. Edgerton.
1853	Richard Warner.	1894	Francis N. Braman.
1854	William H. Cogswell.	1895	Seth Hill.
1856	Benjamin H. Catlin.	1896	Rienzi Robinson.
1858	Ashbel Woodward.	1897	Ralph S. Goodwin.
1861	Josiah G. Beckwith.	1898	Henry P. Stearns.
1863	Ebenezer K. Hunt.	1899	Charles S. Rodman.
1865	Nathan B. Ives.	1900	Leonard B. Almy.
1866	Isaac G. Porter.	1901	John H. Grannis.
1867	Charles Woodward.	1902	Gould A. Shelton.
1868	Samuel B. Beresford.	1903	Samuel B. St. John.
1869	Henry Bronson.	1904	William H. Carmalt.
1870	Charles F. Sumner.	1905	{ †Edward H. Welch.
1871	Gurdon W. Russell.		{ Nathaniel E. Wordin.
1872	Henry W. Buel.	1906	William L. Higgins.
1873	Ira Hutchinson.	1907	Everett J. McKnight.
1874	Lowell Holbrook.	1908	Seldom B. Overlock.
1875	Pliny A. Jewett.	1909	Samuel D. Gilbert.

*Prepared for the Secretary by Dr. J. B. Lewis, Hartford.

†Resigned.

VICE PRESIDENTS.

1792	Eneas Munson.	1875	Ashbel W. Barrows.
1794	Elihu Tudor.	1876	Robert Hubbard.
1796	James Potter.	1877	Charles M. Carleton.
1801	Thomas Mosley.	1878	Alfred R. Goodrich.
1803	Jeremiah West.	1879	Gideon L. Platt.
1804	Jared Potter.	1880	William Deming.
1806	John R. Watrous.	1881	William G. Brownson.
1807	Mason F. Cogswell.	1882	Elisha B. Nye.
1812	John Barker.	1883	Benjamin N. Comings.
1813	Timothy Hall.	1884	Elijah C. Kinney.
1814	Thomas Hubbard.	1885	Samuel Hutchins.
1822	Eli Todd.	1886	Francis Bacon.
1824	Eli Ives.	1887	George L. Porter.
1827	John S. Peters.	1888	Orlando Brown.
1829	William Buel.	1889	Charles J. Fox.
1832	Thomas Miner.	1890	Charles A. Lindsley.
1834	Silas Fuller.	1891	Cyrus B. Newton.
1837	Elijah Middlebrook.	1892	Francis D. Edgerton.
1841	Luther Ticknor.	1893	Francis N. Brame.
1843	Archibald Welch.	1894	Seth Hill.
1846	Dyer T. Brainard.	1895	Rienzi Robinson.
1847	George Sumner.	1896	Ralph S. Goodwin.
1849	Rufus Blakeman.	1897	Henry P. Stearns.
1851	Richard Warner.	1898	Charles S. Rodman.
1853	William H. Cogswell.	1899	Leonard B. Almy.
1854	Benjamin H. Catlin.	1900	John H. Grannis.
1856	Ashbel Woodward.	1901	Gould A. Shelton.
1858	Josiah G. Beckwith.	1902	Samuel B. St. John.
1861	Ebenezer K. Hunt.	1903	William H. Carmalt.
1863	Nathan B. Ives.	1904	Edward H. Welch.
1865	Isaac G. Porter.	1905	{ Frederick A. Morrell.
1866	Charles Woodward.		{ Eli P. Flint.
1867	Samuel B. Beresford.	1906	{ Samuel D. Gilbert.
1868	Henry Bronson.		{ Charles E. Brayton.
1869	Charles F. Sumner.	1907	{ Franklin P. Clark.
1870	Gurdon W. Russell.		{ Miner C. Hazen.
1871	Henry W. Buel.	1908	{ Irving L. Hamant.
1872	Ira Hutchinson.		{ Walter L. Barber.
1873	Lowell Holbrook.	1909	{ Theodore R. Parker.
1874	Pliny A. Jewett.		{ William J. Tracey.

SECRETARIES.

1792	Jared Potter.	1838	Archibald Welch.
1794	James Clark.	1843	Ralph Farnsworth.
1796	Daniel Sheldon.	1844	Worthington Hooker.
1798	Nathaniel Perry.	1846	Gurdon W. Russell.
1800	Samuel Woodward.	1849	Josiah G. Beckwith.
1801	William Shelton.	1858	Panet M. Hastings.
1805	John Barker.	1862	Leonard J. Sanford.
1810	Eli Ives.	1864	Moses C. White.
1813	Joseph Foot.	1876	Charles W. Chamberlain.
1817	Jonathan Knight.	1883	Samuel B. St. John.
1827	Samuel B. Woodward.	1889	Nathaniel E. Wordin.
1830	George Sumner.	1905	Walter R. Steiner.
1832	Charles Hooker.		

TREASURERS.

1792	John Osborn.	1829	Joseph Palmer.
1793	Jeremiah West.	1834	Elijah Middlebrook.
1794	John Osborn.	1837	Luther Tichnor.
1796	Mason F. Cogswell.	1841	Virgil Maro Dow.
1800	William B. Hall.	1851	George O. Sumner.
1808	Timothy Hall.	1863	James C. Jackson.
1813	Richard Ely.	1876	Francis D. Edgerton.
1816	Thomas Miner.	1883	Erastus P. Swasey.
1817	John S. Peters.	1889	William W. Knight.
1827	William Buel.	1905	Joseph H. Townsend.

ALPHABETICAL LIST

OF THE

MEMBERS OF THE CONNECTICUT STATE MEDICAL SOCIETY,

With Date and Place of Graduation, and Post-Office Address.

In preparing this list the Secretary has followed the list in the Proceedings of 1892, made with great care and labor by Dr. J. B. Lewis for the Centennial year. It may be relied upon as being correct.

Ahrams, Alva Elnathan.....	Albany, '81.....	Hartford.
Adam, John Geikie.....	Trinity, Tor., '00.....	North Canaan.
Adams, Frederick Joseph.....	Univ. N. Y., '95.....	Bridgeport.
Adams, Henry Ely.....	Yale, '02.....	Hartford.
Adams, William Waldo.....	Bellevue, '91.....	Moosup.
Alcorn, Thomas Grant.....	P. & S., Boston, '97....	Thompsonville.
Alcott, Ralph Waldo Emerson.....	U. S. Med. Coll., '81....	West Hartford.
Allee, William Hanford.....	P. & S., N. Y., '99.....	Ridgefield.
Allen, Charles Noah.....	Univ. Vt., '81.....	Moosup.
Allen, Howard Oliver.....	Univ. N. Y., '79.....	Broad Brook.
Allen, Lauren Melville.....	P. & S., N. Y., '80....	South Norwalk.
Allen, Millard Filmore.....	Med. Chi., Phila., '95....	New Haven.
Alling, Arthur Nathaniel, B.A., Yale, '86..	P. & S., N. Y., '91.....	New Haven.
Allyn, Gurdon Spicer.....	Univ. Pa., '03.....	New London.
Allyn, Lewis Maxson.....	Univ. Pa., '93.....	Mystic.
Almy, Leonard Ballou, B.A., Yale, '73....	Bellevue, '76.....	Norwich.
Alton, Charles De Lancey.....	Bellevue, '75.....	Hartford.
Anderson, Arvid.....	Univ. Mich., '93.....	New Britain.
Anderson, Henry Gray.....	P. & S., N. Y., '89.....	Waterbury.
Arnold, Ernest Hermann.....	Yale, '94.....	New Haven.
Arnold, Harold Sears, B.A., Yale, '00....	Yale, '03.....	New Haven.
Ashley, Edward Fiske, Ph.B., Yale, '97....	Yale, '00.....	Greenwich.
Atkinson, Edward.....	Univ. Vt., '93.....	Niantic.
Avery, John Waite.....	Univ. Vt., '97.....	Stamford.
Axtelle, John Franklin.....	L. I. Hosp. Coll., '71.....	Hartford.
Backus, Harold Simeon.....	L. I. Hosp. Coll., '03....	Broad Brook.
Bacon, Francis.....	Yale, '53.....	New Haven.
Bacon, Leonard Woolsey, Jr., B.A., Yale, '88..	Yale, '92.....	New Haven.
Bailey, George Cornelius.....	Univ. N. Y., '86.....	Hartford.
Bailey, John Elmore.....	P. & S., N. Y., '85.....	Middletown.
Bailey, Michael Angelo.....	P. & S., Balt., '93.....	Hartford.
Baker, Frederick Birdseye.....	Univ. Md., '88.....	East Norwalk.
Bangs, Dean Cleveland.....	Balt. Med. Coll., '02.....	Milford.
Banks, Charles Lincoln.....	P. & S., N. Y., '91.....	Bridgeport.

- Barber, Alvin Elizur.....Berkshire, '54.....Bethel.
 Barber, Walter Lewis.....Bellevue, '73.....Waterbury.
 Baribault, Arthur Octave.....Vict. Med. Coll., '89.....New Haven.
 Barker, Abram James.....Bellevue, '97.....Torrington.
 Barnes, Frank Hazelhurst.....N. Y. Hom. Med., '96.....Stamford.
 Barnes, George.....Univ. N. Y., '04.....Killingly.
 Barnes, Wm. Samuel, Ph.B., Yale, '95.....Yale, '97.....New Haven.
 Barnett, John Frederick.....Yale, '69.....West Haven.
 Barrett, William Joseph.....Md. Med., '04.....New Haven.
 Barrows, Benj. Safford, Ph.B., Yale, '83.....Univ. N. Y., '87.....Hartford.
 Bartlett, Charles Joseph, B.A., Yale, '92;
 M.A., Yale, '94.....Yale, '95.....New Haven.
 Bartlett, William Bradford.....Harvard, '06.....Hartford.
 Bassett, Clarence Wheeler.....Univ. N. Y., '82.....Sharon.
 Beach, Charles Coffing, Ph.B., Yale, '77....P. & S., N. Y., '82.....Hartford.
 Beach, Charles Thomas.....Yale, '05.....Hartford.
 Beach, Edward Charles.....Yale, '88.....Milford.
 Bean, William Hill, Ph.B., Yale, '82.....Yale, '03.....New Haven.
 Bean, Wright Butler.....P. & S., N. Y., '95.....Rockville.
 Beck, Frederick George.....Yale, '03.....New Haven.
 Bedford, Alletta Langdon, A.B., Cornell....Cornell, '05.....Waterbury.
 Beebe, George Hoxie.....Univ. N. Y., '78.....Guilford.
 Bell, George Newton.....Yale, '92.....Hartford.
 Bell, Newton Stephen.....Univ. Vt., '64.....Windsor.
 Belloso, Frederick.....Yale, '72.....New Haven.
 Benedict, Frank Allen.....P. & S., N. Y., '87.....Seymour.
 Benedict, John Mitchell.....Univ. N. Y., '82.....Waterbury.
 Bercinsky, David.....Yale, '02.....New Haven.
 Bevans, Theodore Frank.....Univ. Minn., '03.....Waterbury.
 Bickford, Henry.....Penn. Eclectic Med., '68.....Hartford.
 Biggs, Thomas Jacob.....Ohio Med., '87.....Stamford.
 Bill, Philip Worcester, Ph.B., Yale, '97....P. & S., N. Y., '01.....Bridgeport.
 Bishop, Frederic Courtney, B.A., Yale, '92..Yale, '95.....New Haven.
 Bishop, Louis Bennett, B.A., Yale, '86....Yale, '88.....New Haven.
 Bissell, Jerome Samuel.....Yale, '94.....Torrington.
 Bissell, William, B.A., Yale, '53.....Yale, '56.....Lakeville.
 Bissell, William Bascom, A.B., Yale, '88....P. & S., N. Y., '92.....Lakeville.
 Blackman, Chester Eugene.....L. I. Hosp. Coll., '97.....Bridgeport.
 Blair, Edward Holden.....P. & S., Balt., '06.....Hartford.
 Blake, Eugene Maurice.....Yale, '06.....New Haven.
 Blanchard, Irving DeLoss.....Yale, '97.....Hartford.
 Blank, Elmer Francis.....Starling, '97.....Bridgeport.
 Blodget, Henry, A.B., Yale, '75.....Bellevue, '81.....Bridgeport.
 Blumer, George.....Cooper Med. Coll., '90.....New Haven.
 Bodley, George Houghton.....Yale Med. School, '07....New Britain.
 Bohannon, Charles Gordon.....Univ. N. Y., '78.....South Norwalk.
 Bohannon, Richard Lee.....Univ. N. Y., '74.....Stamford.
 Borden, Charles Herbert.....P. & S., N. Y., '96.....Hartford.
 Botsford, Charles Porter.....Yale, '94.....Hartford.
 Boucher, James Joseph.....P. & S., Balt., '04.....Hartford.
 Boucher, John Bernard.....P. & S., Balt., '94.....Hartford.
 Bowers, William Cutler.....P. & S., N. Y., '77.....Bridgeport.
 Boynton, Francis Nichols.....Univ. Mich., '03.....New Haven.
 Brackett, Arthur Stone, B.A., Yale, '92....Jefferson, '95.....Bristol.
 Brackett, William Walker.....Jefferson, '96.....New Britain.

- Bradeen, Frederick Barton.....Univ. Pa., '99.....Essex.
 Bradley, Mark Spalding.....P. & S., N. Y., '92.....Hartford.
 Bradstreet, Edward Thomas, B.A., Yale, '74..P. & S., N. Y., '77.....Meriden.
 Brainard, Clifford Brewster, Ph.B., Yale, '94..Yale, '98.....Hartford.
 Brainard, Irving Edwin.....Yale, '02.....Wallingford.
 Braman, Francis Nelson.....Bellevue, '66.....New London.
 Brayton, Charles Erskine.....P. & S., N. Y., '73.....Stonington.
 Brennan, Hubert Daniel.....Univ. Vt., '92.....Bristol.
 Brewer, Edward Pliny, Ph.D.....Dartmouth, '79.....Norwich.
 Bridge, John Law, B.S., Wesleyan, '88;
 Ph.D., Clark, '94.....Harvard, '03.....Thompsonville.
 Bronson, William Thaddeus.....Univ. N. Y., '98.....Danbury.
 Brooks, Frank Terry, B.A., Yale, '90.....L. I. Hosp. Coll., '93.....Greenwich.
 Brooks, Myre Joel.....Yale, '67.....New Canaan.
 Brophy, Edward Joseph.....Yale, '04.....Norwich.
 Brown, Charles Henry.....Univ. N. Y., '93.....Waterbury.
 Brown, David Chester.....Yale, '84.....Danbury.
 Brown, Franklin George.....L. I. Hosp. Coll., '95.....East Norwalk.
 Brown, Louis Raymond, A.B., Tufts.....Tufts Med. Sch., '07.....Middletown.
 Browne, William Tyler, Ph.B., Yale, '78..Harvard, '82.....Norwich.
 Brownlee, Harris Fenton.....P. & S., N. Y., '88.....Danbury.
 Buel, John Laidlaw.....P. & S., N. Y., '88.....Litchfield.
 Buffum, John Harold.....Univ. Vt., '98.....Wallingford.
 Bulkley, Lucius Duncan, A.B., Yale, '66;
 M.A.,P. & S., N. Y., '69.....Norfolk.
 Bull, John Norris.....P. & S., N. Y., '78.....Plainville.
 Bull, Thomas Marcus.....P. & S., N. Y., '87.....Naugatuck.
 Bullard, Marguerite Jane, A.B., Cornell, '02..Cornell Univ., '04.....Putnam.
 Bunce, Philip Dibble, A.B., Yale, '88.....P. & S., N. Y., '91.....Hartford.
 Burke, William.....L. I. Hosp. Coll., '96.....Greenwich.
 Burnell, Francis Edwin.....L. I. Hosp. Coll., '94.....South Norwalk.
 Burnham, John Ladd.....Yale, '99.....Lyme.
 Burr, James Green.....Univ. Balt., '93.....Baltic.
 Burr, Noah Arthur.....Yale, '01.....South Manchester.
 Burroughs, George McClellan.....Balt. Med. Coll., '00.....Danielson.
 Bush, Charles Ellsworth.....Yale, '94.....Cromwell.
 Butler, William James.....L. I. Hosp. Coll., '95.....New Haven.
- Cahill, Joseph Henry.....Balt. Univ., '92.....Hartford.
 Caldwell, William Elry.....Balt. Med. Coll., '95.....West Suffield.
 Calef, Jeremiah Francis, B.A., Wesleyan, '77..Yale, '80.....Middletown.
 Camp, Charles Welford.....Univ. N. Y., '74.....Canaan.
 Campbell, Arthur Joseph.....P. & S., Balt., '85.....Middletown.
 Campbell, Sheldon Samuel Stratton.....Univ. Vt., '02.....Collinsville.
 Carlin, Charles Henry.....Univ. Mich., '96.....Torrington.
 Carmalt, William Henry, M.A., Yale, '81..P. & S., N. Y., '61.....New Haven.
 Carrington, Charles.....P. & S., N. Y., '60.....Farmington.
 Carroll, John James.....Dartmouth, '97.....Naugatuck.
 Carver, John Preston.....Alhany, '96.....Simshury.
 Casey, William Bradford.....Univ. Md., '06.....Waterford.
 Cassidy, Patrick.....Univ. Vt., '65.....Norwich.
 Cassidy, Patrick John, B.A., Yale, '94.....Johns Hopkins, '98.....Norwich.
 Castle, Frank Edwin.....Yale, '70.....Waterbury.
 Chaffee, Jerome Stuart, Ph.B., Yale, '94.....Univ. Pa., '97.....Sharon.
 Chapman, Alhert Taylor.....P. & S., N. Y., '64.....Old Mystic.

- Chase, Arthur Alverdo.....Harvard, '01.....Plainfield.
 Chatfield, Rollin Blackman.....Yale, '93.....Granby.
 Chedel, Charles Brigham.....Dartmouth, '06.....Kensington.
 Cheney, Benjamin Austin, B.A., Yale, '88..Yale, '90.....New Haven.
 Chester, Thomas Weston, B.A., Rutgers, '92;
 M.A., '95.....P. & S., N. Y., '95.....Hartford.
 Chillingworth, Felix Percy.....Yale, '07.....Haddam.
 Chipman, Edwin Clifford, A.B., Alfred Univ.,
 '87P. & S., N. Y., '91.....New London.
 Clark, Robert Moses.....Univ. Pa., '91.....New Britain.
 Clarke, John Alexander.....Bellevue, '97.....Greenwich.
 Clary, George, A.B., Dartmouth, '52.....Yale, '57.....New Britain.
 Clifton, Harry Colman.....Univ. Pa., '01.....Hartford.
 Cloonan, John Joseph.....P. & S., Balt., '97.....Stamford.
 Coates, Frank Avery, A.B., Brown, '72;
 A.M., '75.....P. & S., N. Y., '75.....Mystic.
 Cobb, Albert Edward.....Yale, '98.....Falls Village.
 Coburn, Jessie Milton.....Boston Univ., '74.....Norwalk.
 Cochran, Levi Bennett.....Univ. Pa., '93.....Hartford.
 Cogswell, William Badger.....Bellevue, '81.....Stratford.
 Cohane, Jeremiah Joseph.....Yale, '98.....New Haven.
 Cobane, Timotby Francis.....Yale, '97.....New Haven.
 Cohan, Michael James.....Univ. N. Y., '65.....New Britain.
 Coleburn, Arthur Burr.....P. & S., N. Y., '90.....Middletown.
 Conklin, James Henry.....Univ. Vt., '99.....Hartford.
 Converse, George Frederick.....Yale, '87.....New Haven.
 Coogan, Joseph Albert.....Bellevue, '76.....Windsor Locks.
 Cook, Ansel Granville.....P. & S., N. Y., '87.....Hartford.
 Cooke, Joseph Anthony.....Yale, '97.....Mcriden.
 Cooley, Myron Lynus.....Buffalo Univ., '86.....Waterbury.
 Cooper, Louis Edward, Ph.B., Yale, '84.....Yale, '86.....Ansonia.
 Coops, Frank Harvey, B.A., Dalhousie, '88..P. & S., Balt., '96.....Bridgeport.
 Cowan, Isabel.....Wom. Med. Coll., N. Y., '92, Waterbury.
 Cowell, George B.....P. & S., N. Y., '88.....Bridgeport.
 Cox, Ralph Benjamin.....McGill, '02.....Collinsville.
 Coyle, William Joseph.....Buffalo Univ., '85.....Windsor Locks.
 Craig, Charles Franklin.....Yale, '94.....Danbury.
 Cramm, William Edward.....Univ. Vt., '95.....Mansfield Center.
 Cranc, Augustin Averill, B.A., Yale, '85.....Yale, '87.....Waterbury.
 Crane, Ralph William.....Yale, '05.....Stamford.
 Crary, David, Jr.....Yale, '69.....Hartford.
 Cremin, Lawrence Michael.....Univ. N. Y., '81.....New Britain.
 Cronin, William Daniel.....P. & S., N. Y., '00.....New London.
 Crossfield, Frederick Solon.....Bellevue, '78.....Hartford.
 Crothers, Thomas Davison.....Albany, '65.....Hartford.
 Crowe, Willis Hanford.....P. & S., N. Y., '95.....New Haven.
 Crowley, William Holmes.....Buffalo Univ., '90.....Hartford.
 Curran, Philip John.....P. & S., N. Y., '01.....Bridgeport.
 Curtiss, William Martin Stanley.....Univ. Balt., '93.....Bristol.
 Daggett, William Gibbons, B.A., Yale, '80..Univ. Pa., '84.....New Haven.
 Darling, Ashael Ebenezer.....Harvard, '72.....Killingly.
 Dart, Frederick Howard.....P. & S., N. Y., '84.....Niantic.
 Davenport, Annabella Keith.....S. C. Med. Coll., '03....San Francisco.
 Davis, Charles Clarence.....Yale, '07.....Essex.

- Davis, Edwin Taylor.....Univ. Vt., '88.....Ellington.
 Davis, Elias Wyman, B.A., Yale, '80.....Yale, '92.....Seymour.
 Davis, Gustav Pierpont, B.A., Yale, '66....P. & S., N. Y., '69.....Hartford.
 Day, Fessenden Lorenzo, B.A., Bates, '90..Bellevue, '93.....Bridgeport.
 Deane, Henry AugustusDartmouth, '68.....South Windsor.
 DeBonis, Domenico.....Naples, '90.....Hartford.
 DeForest, Louis Shepard, B.A., Yale, '79;
 M.A., Yale, '91.....Univ. Jena, '85.....New Haven.
 Delaney, William Joseph.....McGill Univ., '87.....Naugatuck.
 Deming, Dudley Brainard, Ph.B., Yale, '97..P. & S., N. Y., '01.....Waterbury.
 Dennis, Frederick Shepard, B.A., Yale, '72;
 M.R.C.S.Bellevue, '74.....Norfolk.
 Devitt, Ellis King.....Univ. Med. Coll., '07.....Lyme.
 DeWolfe, Daniel Charles.....Univ. Vt., '86.....Bridgeport.
 Dickerman, Wilton Elias, B.A., Amherst, '90..Yale, '93.....Hartford.
 Dickinson, Francis McLean, Ph.B.,
 Yale, '00.....P. & S., N. Y., '05.....Rockville.
 Diefendorf, Allen Ross, B.A., Yale, '94....Yale, '96.....New Haven.
 Dillon, John Henry.....Yale, '04.....Waterbury.
 Dole, Mary Phylinda, B.S., Mt. Holyoke, '89..Wom. Med. Coll., Balt., '88, New Haven.
 Donahue, Bartholomew Francis.....Yale Med. Sch., '03.....Wethersfield.
 Donahue, James Joseph.....P. & S., Balt., '96.....Norwich.
 Donaldson, William Henry.....Univ. N. Y., '81.....Fairfield.
 Donovan, Stephen.....P. & S., Balt., '02.....Derby.
 Douglass, Edmund Peaslee.....Univ. N. Y., '89.....Groton.
 Dowd, Michael Joseph.....Balt. Med. Coll., '01.....Thompsonville.
 Dowling, John Francis.....L. I. Hosp. Coll., '90.....Hartford.
 Down, Edwin Augustus.....P. & S., N. Y., '87.....Hartford.
 Downs, Frederick Bradley.....Univ. N. Y., '78.....Bridgeport.
 Drake, Norman Lucie.....Univ. N. Y., '91.....Stonington.
 Driscoll, Daniel Michael.....P. & S., N. Y., '00.....Bridgeport.
 Dumortier, Jean.....Univ. Ghent, Belg., '89, South Norwalk.
 Dunham, Martin Van Buren.....Harvard, '67.....Greenfield Hill.
 Dunn, Frank Martin.....Balt. Med. Coll., '08....New London.
 Dwyer, Patrick James, A.B., Fordham, '94..Univ. N. Y., '97.....Waterbury.
 Edwards, Preston Mylraa, A.B., Atlanta
 Univ., '89.....Penn., '93.....Hartford.
 Egbert, Jay Hobart, A.B., A.M., Univ.
 ChicagoP. & S., N. Y., '97.....Willimantic.
 Eggleston, Jeremiah Dewey.....P. & S., N. Y., '79.....Meriden.
 Eliot, Gustavus, B.A., Yale, '77; A.M.,
 Yale, '82.....P. & S., N. Y., '80.....New Haven.
 Ellis, Thomas Long, B.A., Yale, '94.....Yale, '96.....Bridgeport.
 Elmer, Edward Oliver.....P. & S., Balt., '94.....Hartford.
 Elmes, Frank Atwater.....Yale, '05.....Derby.
 Emmet, Francis Arthur.....Yale, '02.....Hartford.
 Enders, Thomas Burnham, A.B., Yale, '88..P. & S., N. Y., '91.....Hartford.
 Engelke, Charles.....P. & S., N. Y., '02.....Waterbury.
 English, Richard Matthew.....Yale, '98.....Danbury.
 Farrell, John Edward.....Univ. N. Y., '03.....Waterbury.
 Felty, John Wellington, A.M., Emporia,
 Kan., '97.....Jefferson, '84.....Hartford.
 Fenn, Ava Hamlin.....P. & S., Balt., '86.....Meriden.
 Ferguson, George Dean.....Univ. N. Y., '79.....Thomaston.

Ferrin, Carlisle Franklin, B.A., Univ.

Vt., '91.....P. & S., N. Y., '95.....New London.
 Ferris, Harry Burr, B.A., Yale, '87.....Yale, '90.....New Haven.
 Field, Albert.....L. I. Hosp. Coll., '67...East Hampton.
 Finch, George Terwilliger, B.A., Hobart, '75;

M.A., Hobart, '78.....Bellevue, '77.....Thompsonville.

Fisher, Jessie Weston.....Wom. Med. Coll., Pa., '93, Middletown.

Fisher, William Edwin.....Univ. Pa., '76.....Middletown.

Fiske, Isaac Parsons.....Univ. N. Y., '75.....Coventry.

Fitch, Frederick Tracy.....Yale, '04.....East Hampton.

Fitzgerald, Charles.....Univ. Vt., '98.....New Haven.

Fitzgerald, Edward.....P. & S., Balt., '84.....Bridgeport.

Fitzgerald, William Henry.....Univ. Vt., '95.....Hartford.

Flaherty, Hugh Francis.....Yale Med. Sch., '07.....Hartford.

Fleck, Harry Willard.....Jefferson, '96.....Bridgeport.

Fleischner, Henry.....Yale, '78.....New Haven.

Flint, Eli Percival.....Yale, '79.....Rockville.

Flynn, James Henry Joseph.....Yale, '95.....New Haven.

Fontaine, Alphonse.....Laval Univ., '92.....Jewett City.

Foote, Charles Jenkins, B.A., Yale, '83....Harvard, '87.....New Haven.

Ford, Alice Porter.....Wom. Med. Coll., Pa., '04, New Haven.

Ford, George Skiff.....Bellevue, '93.....Bridgeport.

Formichelli, Giovanni.....Univ. Italy, '98.....Bridgeport.

Foster, Dean, M.A., Univ. Kan.....Yale, '99.....Stamford.

Foster, John Pierrepont Codrington, B.A.,

Yale, '69.....Yale, '75.....New Haven.

Foster, Warren Woodend.....Harvard, '82.....Putnam.

Fox, Charles James.....Univ. N. Y., '76.....Hartford.

Fox, David Austin.....Univ. & Belle., '02.....Clinton.

Fox, Edward Gager.....Univ. N. Y., '83.....Wethersfield.

Fox, Morton Earl.....L. I. Hosp. Coll., '03.....Uncasville.

French, Howard Truman.....P. & S., N. Y., '91.....Deep River.

Freney, John Daniel.....L. I. Hosp. Coll., '93.....Waterbury.

Froelich, Charles Edward, B.A.,

Copenhagen, '64.....Copenhagen, '70.....Hartford.

Fromen, Ernst Theodore.....Milwaukee Med. Coll., '97, New Britain.

Frost, Charles Warren Lelab.....P. & S., N. Y., '80.....Waterbury.

Fuller, Horace Smith, B.A., Amherst, '58;

A.M., '61.....P. & S., N. Y., '65.....Hartford.

Gailey, John Joseph.....Bowdoin, '98.....Waterbury.

Gancher, Jacob.....L. I. Coll. Hosp., '06.....Waterbury.

Gandy, Raymond Reeves.....Univ. Pa., '99.....Colchester.

Ganey, Joseph Mattbew.....P. & S., Balt., '04.....New London.

Gardner, Charles Wesley.....Univ. Md., '01.....Bridgeport.

Gardner, James Lester.....Univ. Vt., '81.....Central Village.

Garlick, Samuel Middleton, B.A., Dart., '74..Harvard, '77.....Bridgeport.

Gaylord, Charles Woodward, B.A., Yale, '70..Yale, '72.....Branford.

Gerber, Jacob Wolf.....Univ. Md., '04.....Bridgeport.

Gibbs, Joseph Addison.....P. & S., Chicago, '02.....Suffield.

Gilbert, Samuel Dutton, B.A., Yale, '69....Yale, '71.....New Haven.

Gildersleeve, Charles Childs.....Yale, '96.....East Woodstock.

Gill, Michael Henry.....Yale, '96.....Hartford.

Gillam, William S.....Univ. Pa., '88.....South Manchester.

Gillin, Charles Adelbert.....Univ. N. Y., '83.....New Britain.

- Gilmore, John Leo.....Yale, '04.....West Haven.
 Gilnack, Frederick.....P. & S., N. Y., '67.....Rockville.
 Girard, Charles Hermenigilde.....Victoria, '96.....Willimantic.
 Girouard, Joseph Arthur.....Balt. Med. Coll., '99.....Willimantic.
 Gladwin, Ellen Hammond.....Wom. Med. Coll., N. Y., '72, Hartford.
 Glynn, Dennis Lawrence.....Balt. Med. Coll., '02.....Portland.
 Godfrey, Charles Cartlidge.....Dartmouth, '83.....Bridgeport.
 Godfrey, William Truitt.....Yale, '07.....Stamford.
 Gold, James Douglass, Ph.B., Yale, '88....P. & S., '91.....Bridgeport.
 Gompertz, Louis Michael.....Yale, '96.....New Haven.
 Goodenough, Edward Winchester, B.A.,
 Yale, '87.....Yale, '93.....Waterbury.
 Goodrich, Charles Augustus, B.S.,
 Mass. Ag. Coll., '93.....P. & S., N. Y., '96.....Hartford.
 Goodrich, William Albert.....Med. Chi. Phila., '02.....Waterbury.
 Goodwin, Ralph Schuyler, Ph.B., Yale, '90....P. & S., N. Y., '93.....Thomaston.
 Gordon, William Francis.....L. I. Hosp. Coll., '96.....Danbury.
 Gorham, FrankYale, '76.....Lyons Plains.
 Granniss, Irwin.....Yale, '96.....Old Saybrook.
 Graves, Charles Burr, B.A., Yale, '82.....Harvard, '86.....New London.
 Graves, Frederick Chauncey.....Univ. N. Y., '88.....Bridgeport.
 Graves, Frederick George.....Yale, '92.....Waterbury.
 Gray, William Henry.....P. & S., N. Y., '89.....Old Mystic.
 Gray, William Wetmore, B.S., Dickinson, '85..Bellevue, '90.....Bridgeport.
 Greenstein, Morris Jacob.....Univ. South, '06.....Bridgeport.
 Gregory, James Glynn, B.A., Yale, '65....P. & S., N. Y., '68.....Norwalk.
 Gregory, Ward Slosson, Ph.B., Yale, '99....P. & S., N. Y., '03.....Norwalk.
 Griggs, John Bagg.....Yale, '97.....Hartford.
 Griswold, Arthur Heywood, A.B.,
 Harvard, '02.....Johns Hopkins, '06.....Hartford.
 Griswold, Frederick Pratt.....P. & S., N. Y., '76.....Meriden.
 Griswold, Julius Egbert.....Univ. N. Y., '79.....Newington.
 Griswold, William Loomis, Ph.B., Yale, '81....P. & S., N. Y., '85.....Greenwich.
 Guild, Frank Eugene.....L. I. Hosp. Coll., '85.....Windham.
 Hadley-Judd, Etta May.....Wom. Med. Coll., Phila., '95, Bethlehem.
 Hall, Edward Dermenio.....Harvard, '73.....Meriden.
 Hall, Joseph Barnard.....Yale, '92.....Hartford.
 Hallock, Frank Kirkwood, A.B., Wesleyan,
 '82; A.M., '85.....P. & S., N. Y., '85.....Cromwell.
 Hamant, Irving Louis.....L. I. Hosp. Coll., '90.....Norfolk.
 Hamilton, Charles Allen.....Univ. Vt., '86.....Waterbury.
 Hammond, Henry Louis, Ph.B., Brown, '65..Harvard, '66.....Killingly.
 Hammond, Samuel Mowbray.....Yale, '96.....New Haven.
 Hanchett, Harry Bigelow.....Jefferson, '05.....Torrington.
 Hanchett, Thatcher Swift.....Bellevue, '64.....Torrington.
 Hanley, John Patrick.....Cornell, '06.....Stafford Springs.
 Harriman, Patrick Henry.....Univ. N. Y., '84.....Norwich.
 Harrington, James Leon.....Jefferson, '03.....New London.
 Harrington, Robert Earl.....Balt. Med. Coll., '06.....Terryville.
 Harrison, John Francis.....Jefferson, '03.....Stamford.
 Hart, Charles Remington.....P. & S., N. Y., '59.....Bethel.
 Hartshorn, Willis Ellis, Ph.B., '95,
 Colo. Coll.Univ. Minn., '98.....New Haven.
 Haskell, Charles Nahum.....Univ. Vt., '90.....Bridgeport.
 Hatheway, Clarence Morris.....Bellevue, '03.....Hartford.

- Hawkes, William Whitney, B.A., Yale, '79..Yale, '81.....New Haven.
 Hayes, James Dermot, B.S., Manbattan
 Coll., N. Y.....Univ. N. Y., '94.....Torrington.
 Hayes, John Frances.....Univ. N. Y., '79.....Waterbury.
 Haylett, Howard Bulkley.....Vermont, '07.....Hartford.
 Hazen, Miner Comstock.....Univ. Mich., '55.....Haddam.
 Hazen, Robert, A.B., Univ. Vt., '96.....Univ. Vt., '98.....Tbomaston.
 Henkle, Emmanuel Alexander.....Cornell, '99.....New London.
 Henze, Carl William.....Yale, '00.....New Haven.
 Hepburn, Thomas Norval, A.B., Randolph
 Macon, '00.....Johns Hopkins, '05.....Hartford.
 Herbert, Archibald Cecil.....Univ. Va., '03.....New Haven.
 Hertzberg, George Robert.....Dartmouth, '99.....Stamford.
 Hessler, Herman Philip.....Yale, '03.....New Haven.
 Hetzel, Joseph Linn.....Bellevue, '91.....Southport.
 Heublein, Arthur Carl.....P. & S., N. Y., '02.....Hartford.
 Hewes, Frank William.....Univ. Vt., '94.....Groton.
 Heyer, Harold Hankinson.....Univ. N. Y., '87.....New London.
 Higgins, Gould Shelton.....Yale, '01.....North Haven.
 Higgins, Harry Eugene.....Univ. N. Y., '96.....Norwich.
 Higgins, Royal Lacey.....Bellevue, '67.....Norwalk.
 Higgins, William Lincoln.....Univ. N. Y., '90.....South Coventry.
 Hill, Charles Edwin, B.A., Yale, '76.....Harvard, '79.....East Killingly.
 Hill, William Martin.....Univ. Va., '97.....Noank.
 Hills, Laura Heatb.....Wom. Med. Coll., Pa., '96, Willimantic.
 Hlne, Henry Kingsley.....Md. Med., '08.....Waterbury.
 Hitchcock, Walter, Pb.B., Yale, '80.....P. & S., N. Y., '83.....Norwalk.
 Hodgson, Thomas Cady.....Toronto, '94.....East Berlin.
 Hogan, William John.....Yale, '98.....Torrington.
 Holbrook, Charles Werden, M.A.,
 Amberst, '93.....Yale, '96.....East Haven.
 Holmes, Artbur Almond.....Harvard, '65.....Bridgeport.
 Horton, William Wickham.....Univ. N. Y., '79.....Bristol.
 Hotchkiss, Edward Alfred.....McGill, '04.....Hartford.
 Hotchkiss, Norton Royce.....Univ. Md., '91.....New Haven.
 Houghton, Simon Willard.....Bellevue, '79.....Hazardville.
 House, Albert Lewis.....Yale, '95.....Noroton.
 Howard, Artbur Wayland.....Univ. N. Y., '90.....Wethersfield.
 Howard, John.....Dartmouth, '81.....Hartford.
 Howd, Salmon Jennings.....Jefferson, '83.....Winsted.
 Howe, Harmon George.....Univ. Vt., '73, P. & S., N. Y., '75, Hartford.
 Howe, Herbert H.....Univ. Vt., '80.....Yantic.
 Hoyt, Curtis Clark.....P. & S., N. Y., '87.....Bridgeport.
 Hoyt, Harold Eliphalet, A.B., Univ. Kansas. Albany, '94.....Noroton Heights.
 Hulbert, William Sharon.....Univ. N. Y., '80.....Winsted.
 Hungerford, Henry Edward.....Yale, '98.....Waterbury.
 Huntington, Samuel Henry.....Yale, '76.....Norwalk.
 Hupert, Julius, A.B., Univ. Lemberg.....Univ. Lemberg, '02.....New Britain.
 Hurd, Alonzo L., B.S., Me., '82.....Univ. Vt., '91.....Somers.
 Hurlbut, Augustin Moen, B.A., Yale, '76..P. & S., N. Y., '79.....Stamford.
 Hyde, Fritz Carleton.....Univ. Mich., '60.....Greenwich.
 Hyde, Harriet Baker.....Univ. Mich., '00.....Greenwich.
 Hynes, Thomas Vincent.....Yale, '00.....New Haven.

Ingalls, Phineas Henry, A.B., Bowdoin, '77;

A.M., Bowdoin, '85.....P. & S., N. Y., '80.....Hartford.

- Irving, Samuel Wellington.....Yale, '91.....New Britain.
 Isham, Oliver Kingsley.....Univ. N. Y., '88.....Hartford.
 Ives, Eli Butler.....Yale, '03.....Bridgeport.
 Ives, John W.Yale, '00.....Milford.
- Jennings, George Herman.....L. I. Hosp. Coll., '75.....Jewett City.
 Johnson, Edwin Hines.....Univ. Vt., '88.....Naugatuck.
 Johnson, Frederick Eugene.....Univ. N. Y., '79.....Mansfield.
 Johnson, John Murray.....L. I. Hosp. Coll., '95.....Bridgeport.
 Johnson, Marcus Morton, Ph.B., Brown, '70..Univ. N. Y., '77.....Hartford.
 Joslin, George Harvey.....Univ. Vt., '87.....Mt. Carmel.
 Judson, William Henry.....Jefferson, '78.....Danielson.
- Kane, James Hugh.....Md. Med., Coll., '04.....Thomaston.
 Kane, Thomas Francis.....Bellevue, '87.....Hartford.
 Karrman, Edward William.....N. Y. Univ., '84.....Cheshire.
 Keane, Robert Barnabas.....Bellevue, '03.....Bridgeport.
 Keating, Wm. Patrick Stuart.....Jefferson, '99.....Willimantic.
 Keith, Albert Russell, A.B., Colby, '97....Harvard, '03.....Hartford.
 Kelsey, Ernest Russell.....Univ. Md., '01.....Winsted.
 Kellogg, Kenneth Everghim.....P. & S., N. Y., '98.....New Britain.
 Kendall, John Calvin, B.A., Yale, '70.....P. & S., N. Y., '75.....Norfolk.
 Keniston, James Mortimer.....Harvard, '71.....Middletown.
 Kenna, William Matthew, Ph.B., Yale, '90..Yale, '92.....New Haven.
 Kent, John Bryden.....Harvard, '60.....Putnam.
 Kilbourn, Clarence Leishman.....Yale, '97.....New Haven.
 Kilbourn, Joseph Austin.....P. & S., Balt., '97.....Hartford.
 Kilmartin, Thomas J.Univ. N. Y., '95.....Waterbury.
 Kimball, Rush Wilmot, A.B., Williams, '87..L. I. Hosp. Coll., '90.....Norwich.
 King, Howard Frost.....Albany, '99.....Windsor.
 Kingman, James Henry, A.B., Yale, '82....P. & S., N. Y., '85.....Middletown.
 Kingsbury, Isaac William, A.B.,
 Harvard, '96.....P. & S., N. Y., '03.....Hartford.
 Kingsbury, William Sanford.....Yale, '96.....Glastonbury.
 Klein, Alvin Walter.....Cin. Coll. Med. & Surg., '89, Greenwich.
 Knight, George Henry, A.M., Yale, '98....P. & S., N. Y., '86.....Lakeville.
 Knight, William Ward.....Univ. N. Y., '76.....Hartford.
 Kowalewski, Victor Alexander, B.A.,
 Yale, '99.....Yale, '02.....West Haven.
- Laden, Michael Richard.....Univ. N. Y., '98.....Hartford.
 Lambert, Benjamin Lott.....Univ. N. Y., '83.....New Haven
 Lampson, Edward Rutledge, A.B.,
 Trinity, '91.....P. & S., N. Y., '96.....Hartford.
 Landry, Joseph Napoleon.....Laval, '01.....Putnam.
 Lane, Frederick Pollock.....Yale, '04.....New Haven.
 Lane, John Edward, B.A., Yale, '94;
 M.A., '97.....Yale, '03.....New Haven.
 LaPierre, Leone Franklin.....Yale, '01.....Norwich.
 LaPoint, John William Henry.....Laval Univ., Montreal, '92...Meriden.
 LaRue, Omer.....Vict., Montreal, '71.....Putnam.
 Lauder, Robert, M.A., Wesleyan, '89.....Yale, '71.....Bridgeport.
 Lawson, George Newton, B.A., Yale, '90...Yale, '92.....Middle Haddam.
 Lawson, Stuart Johnston.....Univ. Md., '05.....New London.
 Lawton, Franklin Lyman, Ph.B., Yale, '90..Yale, '93.....Hartford.

Lay, Walter Sidders.....Yale, '01.....Hamden.
 Lee, Frank Herhert.....Albany, '88.....Canaan.
 Lee, Harry Moore.....Columbia, '98.....New London.
 Lemmer, George Edward.....Bellevue, '85.....Danbury.
 Leverty, Charles Joseph.....N. Y. Univ. & Belle., '01.....Bridgeport.
 Lewis, Dwight Milton, B.A., Yale, '97.....Johns Hopkins, '01.....New Haven.
 Lewis, George Francis, B.A., '64.....Yale, '65.....Collinsville.
 Lewis, George Frederick, B.A., Trinity, '77..Yale, '84.....Stratford.
 Lewis, John Benjamin.....Univ. N. Y., '53.....Hartford.
 Lindsley, Charles Purdy, Ph.B., Yale, '75...Yale, '78.....New Haven.
 Littlejohn, Percy Duncan.....Yale, '97.....New Haven.
 Lockhart, Reuben Arthur.....Yale, '91.....Bridgeport.
 Lockwood, Howard DeForest.....Yale, '01.....Meriden.
 Loomis, Francis Newton, B.A., Yale, '81...Yale, '83.....Derby.
 Lord, Sydney Arthur.....Harvard, '94.....Cromwell.
 Loveland, Ernest Kilburn.....Yale, '97.....Watertown.
 Loveland, John Elijah, A.B., Wesleyan, '89..Harvard, '92.....Middletown.
 Lowe, Henry Russell.....Dartmouth, '82.....Putnam.
 Lowe, Russell Walter.....Univ. N. Y., '89.....Ridgefield.
 Luhy, John Francis, Ph.B., Yale, '76.....P. & S., N. Y., '78.....New Haven.
 Ludington, Nelson Amos.....Yale, '01.....New Haven.
 Luther, Calista Vinton.....Wom. Med., Coll., Pa., '85, Old Saybrook.
 Lyman, David Russell.....Univ. Va., '99.....Wallingford.
 Lynch, John Charles.....Univ. N. Y., '86.....Bridgeport.
 Lynch, Robert Joseph.....Bellevue, '97.....Bridgeport.
 Lyon, Edwin Bradbury.....Berkshire, '62.....Hartford.

MacLean, Donald Robert.....Balt. Med. Coll., '01.....Stamford.
 Maguire, Edward O'Reilly.....P. & S., N. Y., '98.....Derby.
 Maher, James Stephen, Ph.B., Yale, '92...Yale, '96.....New Haven.
 Maher, Stephen John.....Yale, '87.....New Haven.
 Mailhouse, Max, Ph.B., Yale, '76.....Yale, '78.....New Haven.
 Maitland, Lewis.....Univ. Pa., '95.....Middletown.
 Maloney, Daniel Joseph.....Univ. N. Y., '96.....Waterbury.
 Maloney, Maurice Washington.....Jeff. Med. Coll., Phil., '97, New Britain.
 Mansfield, Howard Parker.....L. I. Hosp. Coll., '93.....Ridgefield.
 Mariani, Nicola.....Univ. Naples, '93.....New Haven.
 Marsh, Arthur Washburn.....Univ. Vt., '82.....New Haven.
 Martelle, Henry Augustus, A.B.,

Bowdoin, '01.....Johns Hopkins, '05.....Hartford.
 Mason, Louis Irving.....P. & S., N. Y., '91.....Williamantic
 May, George William.....Milwaukee Med. Coll., '95, So. Manchester.
 May, Jacob Rush.....Chicago, '76.....Bridgeport.
 Mayberry, Franklin Hayden.....Univ. Vt., '85.....East Hartford.
 Mayer, Nathan.....Cincinnati, '57.....Hartford.
 McCahe, Edward Michael, B.A.,

Manhattan, '83.....Yale, '87.....New Haven.
 McCarthy, Timothy William.....Balt. Med. Coll., '06.....Rockville.
 McCook, John Butler.....P. & S., N. Y., '94.....Hartford.
 McDonald, Arthur Francis.....P. & S., N. Y., '05.....Waterbury.
 McDonnell, Ralph Augustine, B.A.,

Yale, '90.....Yale, '92.....New Haven.
 McFarland, David Walter.....Univ. N. Y., '85.....Greens Farms.
 McGaughey, James David.....Jefferson, '70.....Wallingford.

- McIntosh, Edward Francis.....Yale, '97.....New Haven.
 McKee, Frederick Lyman.....P. & S., N. Y., '99.....Hartford.
 McKnight, Everett James, B.A., Yale, '76..P. & S., N. Y., '79.....Hartford.
 McLarney, Thomas Joseph.....P. & S., Balt., '97.....Waterbury.
 McLinden, James John.....Univ. Pa., '98.....Waterbury.
 McNeil, Archibald.....Dartmouth, '95.....New Haven.
 McNeil, Rollin.....Yale, '62.....New Haven.
 McPartland, Patrick Farrel.....Balt. Med. Coll., '05.....Hartford.
 Meade, Kate Campbell.....Wom. Med. Coll., Pa., '88, Middletown.
 Meeks, Harold Albert.....Bellevue, '90.....Meriden.
 Miles, Henry Shillingford, Ph.G., N. Y., '88..P. & S., N. Y., '91.....Bridgeport.
 Miller, George Root.....P. & S., Balt., '86.....Hartford.
 Miller, William Radley.....Albany, '98.....Southington.
 Minor, George Maynard.....L. I. Hosp. Coll., '85.....Waterford.
 Mitchell, James Thomas.....Univ. N. Y., '91.....Middletown.
 Molumphy, David James.....Jefferson, '06.....Hartford.
 Monagan, Charles Andrew, B.S.,
 Trinity, '93.....Univ. Pa., '98.....Waterbury.
 Monahan, David Henry, M.A.,
 Manhattan, '83.....Dartmouth, '00.....Bridgeport.
 Moody, Mary Blair.....Buffalo, '76.....New Haven.
 Moore, Howard Doolittle.....Bellevue, '97.....Torrington.
 Morgan, William Dennison, A.B.,
 Trinity, '72.....P. & S., N. Y., '76.....Hartford.
 Moriarty, James Ligouri.....Harvard, '96.....Waterbury.
 Morrell, Frederick Augustus.....L. I. Hosp. Coll., '85.....Putnam.
 Morrissey, Michael James.....P. & S., Balt., Md., '97....Unionville.
 Moser, Oran Alexander.....Yale, '02.....Rocky Hill.
 Moulton, Edward Seymour, B.A.,
 Oherlin, '91.....Yale, '94.....New Haven.
 Mountain, John Henry.....Jefferson, '96.....Middletown.
 Munger, Carl Eugene, Ph.B., Yale, '80....P. & S., N. Y., '83.....Waterbury.
 Murphy, James.....Univ. Pa., '95.....Middletown.
 Murphy, Michael Daniel.....Bellevue, '84.....Middletown.
 Murphy, Walter Graham.....Albany Med. Coll., '90..East Hartford.

 Nadler, Alfred Goldstein, B.A., Yale, '93....Yale, '96.....New Haven.
 Naylor, James Henry.....Univ. Vt., '95.....Hartford.
 Nelson, Abiel Ward.....Harvard, '61.....New London.
 Nettleton, Francis Irving, Ph.B., Yale, '94..Yale, '97.....Shelton.
 Nettleton, Irving LaField.....L. I. Hosp. Coll., '98.....Bridgeport.
 Newton, Cyrus Brownlie.....Yale, '56.....Stafford Springs.
 Nickerson, Nehemiah.....N. Y. Med. Coll., '57.....Meriden.
 Nicoll, John.....Yale, '54.....New Haven.
 Nohle, Henry Smith, A.B., Tufts, '69;
 LL.D., Tufts, '05.....P. & S., N. Y., '71.....Middletown.
 Nolan, Daniel Andrew, Ph.G., Phil., '93....Med. Chir., Phila., '95....Middletown.
 North, Caroline.....Tufts, '98.....Wallingford.
 North, John Leopold.....Med. Dept. Univ. Louisville, '94, So. Manchester.
 North, Joseph Howard.....L. I. Hosp. Coll., '73.....Goshen.
 Notkins, Louis Adolph.....Yale, '03.....New Haven.
 Noxon, George Henry.....Balt. Med. Coll., '93.....Darien.

 Oher, George Eugene.....Univ. Vt., '90.....Bridgeport.
 O'Connell, Timothy Grattan.....Yale Med Sch., '99.....Bristol.

O'Connell, Thomas Smith.....P. & S., Balt., '92.....East Hartford.
O'Connor, Matthew Charles, A.B., St.

Francis X., N. Y., '69.....P. & S., N. Y., '73.....New Haven.
O'Connor, Patrick Thomas.....Bellevue, '92.....Waterbury.
O'Flaherty, Ellen Pembroke.....Cornell, '01.....Hartford.
O'Hara, Bernard Augustine.....Bellevue, '82.....Waterbury.
O'Hara, William James Aloysius.....P. & S., Balt., '93.....Bridgeport.
O'Laughlin, Thomas Francis.....Univ. N. Y., '96.....Rockville.
O'Neil, Owen.....Jefferson, '04.....Willimantic.
Osborn, George Wakeman, B.A., Yale, '84..P. & S., N. Y., '87.....Bridgeport.
Osborne, Oliver Thomas.....Yale, '84.....New Haven.
O'Shaughnessy, Edmund Joseph.....Bellevue, '99.....New Canaan.
Otis, Samuel Dickinson.....Univ. N. Y., '77.....Meriden.
Outerson, Andrew Mansergh.....Jefferson Med. Soc., Phila., '06, Hartford.
Outerson, Richard Ambrose.....Jefferson, '02.....Windsor Locks.
Overlock, Seldom Burden, B.A., Colby, '86..Bellevue, '89.....Pomfret.
Owens, William Thomas.....Univ. Vt., '99.....Hartford.

Page, Charles Ithamar.....P. & S., N. Y., '90.....Litchfield.
Paine, Robert Child.....Dartmouth, '00.....Thompson.
Park, Charles Edwin.....Yale, '81.....New Haven.
Parker, Edward Oliver, A.B.,

Harvard, '91.....P. & S., N. Y., '96.....Greenwich.
Parker, John Woodsock.....Yale, '06.....Westbrook.
Parker, Theodore Raymond.....Univ. N. Y., '80.....Willimantic.
Parker, Thomas Edward.....Yale, '04.....Waterbury.
Parmelee, Edward Kibbe.....L. I. Hosp. Coll., '89.....Ansonia.
Parmele, George Luther, D.M.D.,

Harvard, '70.....L. I. Hosp. Coll., '69.....Hartford.
Parsons, Edward Field, A.B., Williams, '48..P. & S., N. Y., '58.....Thompsonville.
Patterson, Daniel Cleveland.....P. & S., Balt., '06.....Bridgeport.
Peck, Anthony, B.A., Hamilton, '72.....Univ. N. Y., '75.....Norwich.
Peck, Robert Ellsworth, Ph.B., Yale, '90..Yale, '93.....New Haven.
Peckham, Lucy Creemer.....Wom. Med. Coll., Pa., '85, New Haven.
Pendleton, Cyrus Edmund.....Yale, '03.....Hebron.
Pendleton, Cyrus Henry.....Western Reserve, '60.....Hebron.
Perkins, Charles Harris.....P. & S., N. Y., '91.....Norwich.
Perkins, William Sheldon Clark.....P. & S., N. Y., '60.....Norwich.
Perry, Edward Franklin.....L. I. Hosp. Coll., '97.....Putnam.
Phelps, Charles Dickinson, B.A.,

Amherst, '89; M.A., Amherst, '97.....P. & S., N. Y., '95.....West Haven.
Philip, Rosavelle Gardner.....Wom. Med. Coll., N. Y. Inf., '75, Stamford.
Phillips, Alfred Noroton.....P. & S., N. Y., '83.....Stamford.
Phillips, Frank Lyman.....Yale, '06.....New Haven.
Pierce, Elbridge Worthington.....Univ. N. Y., '85.....Meriden.
Pierson, John Corbin.....Tufts, '03.....Hartford.
Pierson, Samuel.....P. & S., N. Y., '81.....Stamford.
Pike, Ernest Reginald.....Univ. Mich., '98.....Lakeville.
Pinney, Almon William.....Hahnemann Med. Coll., Phila., '00, Norfolk.
Pinney, Royal Watson.....P. & S., N. Y., '88.....Derby.
Pitman, Edwin Parker, B.A.,

Dartmouth, '86.....Dartmouth, '91.....New Haven.
Platt, William Logan.....P. & S., N. Y., '81.....Torrington.
Plummer, Paul.....Univ. Vt., '94.....Collinsville.
Plumstead, Matthew Woodbury.....Jefferson '87.....Middletown.

- Pomeroy, Nelson Asa.....P. & S., N. Y., '96.....Waterbury.
 Pons, Louis Jacques.....Univ. Vt., '85.....Roxbury.
 Porter, George Loring, B.A., Brown, '59....Jefferson, '62.....Bridgeport.
 Porter, Isaac Napoleon, B.A., Lincoln
 Univ., '90.....Yale, '93.....New Haven.
 Porter, William, Jr.....Chicago Med. Coll., '81.....Hartford.
 Potter, Frank Edward.....P. & S., N. Y., '89.....Portland.
 Potts, Joseph Henry.....Dartmouth, '05.....New Britain.
 Powers, Frederick.....P. & S., N. Y., '70.....Westport.
 Pratt, Arthur Milon.....Bellevue, '92.....Deep River.
 Pratt, Charles Reed.....Yale, '05.....Bridgeport.
 Pratt, Edward Loomis.....Univ. N. Y., '84.....Winsted.
 Pratt, Elias.....P. & S., N. Y., '87.....Torrington.
 Pratt, Nathan Tolles, A.B., Trinity, '94;
 M.A., '97.....Yale, '04.....Bridgeport.
 Purinton, Charles Oscar, Ph.B., Yale, '97..Yale, '00.....West Hartford.
 Purney, JohnBalt. Med. Coll., '06.....New Britain.
 Pyle, Francis Winthrop, A.B., Yale, '97....P. & S., N. Y., '02.....Bridgeport.

 Ramsay, Otto Gustaf, M.A., Yale, '01, Hon., Univ. Va., '90.....New Haven.
 Rand, Richard Foster, Ph.B., Yale, '95....Johns Hopkins, '00.....New Haven.
 Randall, William Sherman, Ph.B.,
 Yale, '83.....P. & S., N. Y., '86.....Shelton.
 Rankin, Charles Goodrich, A.B.,
 Williams, '84; A.M., '87.....Chicago Med. Coll., '86...Glastonbury.
 Reeks, Thomas Ehen.....Univ. Md., '01.....New Britain.
 Reidy, David Dillon.....Med. Chi., Phila., '99.....Winsted.
 Reilly, Francis Henry.....Yale, '97.....New Haven.
 Reilly, James Michael.....Yale, '78.....New Haven.
 Reinert, Emil Gustav.....Balt. Med. Coll., '95.....Hartford.
 Reynolds, William George.....Yale, '97.....Hotchkissville.
 Rice, Watson Emmons.....Univ. Mich., '72.....Stamford.
 Richards, William Spencer.....Univ. N. Y., '89.....West Winsted.
 Ring, Henry Wilson, A.B., Bowdoin, '79;
 M.A., Bowdoin, '82.....Me. Med. Coll., '81.....New Haven.
 Ringe, Milo Pember.....P. & S., Cleveland, '05.....Madison.
 Rising, Harry Breed.....Yale, '95.....South Glastonbury.
 Rising, Henry Martin.....Yale, '68.....South Glastonbury.
 Robbins, Charles Henry.....Balt. Med. Coll., '95.....New Haven.
 Robbins, George Orrin.....Yale, '79.....Waterbury.
 Robbins, James Watson.....Bellevue, '80.....Naugatuck.
 Roberts, Albert Joseph.....Harvard, '02.....Bridgeport.
 Roberts, Edward Kilbourne, Ph.B.,
 Yale, '78.....Yale, '80.....New Haven.
 Robinson, Joseph.....P. & S., N. Y., '98....West Cornwall.
 Robinson, Myron Potter.....Yale, '95.....Windsor Locks.
 Robinson, Myron Winslow.....Berkshire, '60.....Noroton.
 Robinson, Paul Skiff, Ph.B. Yale, '89....Yale, '91.....New Haven.
 Robinson, Rienzi.....L. I. Hosp. Coll., '69.....Danielson.
 Rock, Emilien.....Victoria, '89....North Grosvenordale.
 Rockwell, Thomas Francis.....Univ. N. Y., '81.....Rockville.
 Rodman, Charles Shepard.....P. & S., N. Y., '68.....Waterbury.
 Rogers, Frederick.....Univ. N. Y., '63.....Willimantic.
 Rogers, Henry Alexander.....Bellevue, '86.....New London.
 Rogers, Thomas Weaver.....P. & S., N. Y., '90.....New London.

- Ronayne, Frank Joseph.....Yale, '04.....West Hartford.
 Rooney, James Francis.....Balt. Med. Coll., '03.....Hartford.
 Root, Edward King.....Univ. N. Y., '79.....Hartford.
 Root, Joseph Edward, B.S., Boston
 Univ., '76.....P. & S., N. Y., '83.....Hartford.
 Rose, John Henry.....Univ. N. Y., '92.....Hartford.
 Rowley, Alfred Merriman.....Univ. Vt., '97.....Hartford.
 Rowley, Robert Lee.....Yale, '03.....Hartford.
 Ruickoldt, Frederick Arthur.....Jena, '65.....New Haven.
 Ruland, Frederick Davis.....P. & S., N. Y., '89.....Westport.
 Rundlett, David Livingstone.....P. & S., N. Y., '89.....New Haven.
 Russell, George Wasbington.....Bellevue, '96.....Waterbury.
 Russell, Thomas Hubbard, Ph.B., Yale, '72..Yale, '75.....New Haven.
 Russell, William Spencer.....Yale, '80.....Wallingford.
 Ryan, Joseph Patrick.....P. & S., N. Y., '03.....Hartford.
 Ryan, Patrick Joseph.....Niagara, '98.....Hartford.
 Ryan, Timothy Mayher, A.B., Loyola Coll..Balt. Med., '02.....Torrington.
 Ryle, John Joseph, A.B. and B.S.,
 Villanova, '94.....Univ. Buffalo, '97.....Stamford.
- Sanford, Leonard Cutler, B.A., Yale, 90..Yale, '93.....New Haven.
 Sanford, Ward Harding.....Balt. Med. Coll., '95.....New Haven.
 Schavoir, Frederick.....P. & S., Balt., '87.....Stamford.
 Schulz, Herman Samuel.....Hahnemann, '01 (Phil.)....Bridgeport.
 Scoville, Clarence Henry.....Balt. Med. Coll., '92.....New Canaan.
 Sears, Cushman Allen.....Univ. N. Y., '62.....Portland.
 Seaver, Jay Webber, B.A., Yale, '80;
 M.A., '93.....Yale, '85.....New Haven.
 Sedgwick, James Theodore.....Univ. N. Y., '85.....Litchfield.
 Segur, Gideon Cross.....P. & S., N. Y., '82.....Hartford.
 Selleck, Nathaniel.....Univ. N. Y., '89.....Danbury.
 Shanan, Dennis Joseph.....Univ. Vt., '85.....Norwich.
 Shannon, James Bernard.....Victoria, '89.....Danielson.
 Sbarpe, Elmer Thomas.....Univ. N. Y., '95.....Derby.
 Sharpe, Harry Rabe.....Univ. Vt., '00.....Manchester.
 Sheedy, George Francis, Ph.B., Yale, '99..Yale, '02.....Bridgeport.
 Sbeehan, William Joseph, B.S., Manhattan
 Coll., '92.....Yale, '95.....New Haven.
 Shelton, Gould Abijah, M.A., Yale, '91...Yale, '69.....Shelton.
 Sherer, Henry Clifford.....Univ. N. Y., '92.....South Norwalk.
 Sherrill, George.....P. & S., '91.....Stamford.
 Simmons, Willard Nelson.....Univ. Vt., '89.....Tolland.
 Simonds, Clarence Eugene.....Univ. N. Y., '97.....Willimantic.
 Simpson, Frederick Thomas, B.A., Yale, '79..Me. Med. Coll., '84.....Hartford.
 Skiff, Francis Sands.....Univ. N. Y., '88.....Falls Village.
 Skinner, Clarence Edward, LL.D.,
 Rutherford, N. C., '00.....Yale, '91.....New Haven.
 Slattery, Morris Dove.....Yale, '93.....New Haven.
 Sleeper, George Everest.....Dartmouth, '95.....Hartford.
 Sloan, Thomas George.....P. & S., N. Y., '99..South Manchester.
 Smirnow, Louis Mair.....Yale, '95.....Bridgeport.
 Smith, Andrew Jackson.....P. & S., N. Y., '63.....Bridgeport.
 Smith, Charles.....L. I. Hosp. Coll., '90.....Riverside.
 Smith, Dorland, A.B., Yale, '96.....Yale, '99.....Bridgeport.
 Smith, Earl Terry.....Yale, '97.....Hartford.

- Smith, Edwards Montrose.....P. & S., N. Y., '82.....Bridgeport.
 Smith, Edward Weir, A.B., Yale, '78.....McGill, Mont., '82.....Meriden.
 Smith, Egbert Livingston.....Yale, '96.....Waterbury.
 Smith, Ernest Herman, A.B. Amherst, '85..P. & S., N. Y., '89.....Redding.
 Smith, Frank Lewis.....Univ. N. Y., '75.....Stafford Springs.
 Smith, Frank Llewellyn.....Alhany, '83.....Bridgeport.
 Smith, Frederick Sumner, B.A., Yale, '79..Yale, '82.....Chester.
 Smith, George Arthur, A.B., Yale, '03.....J. H. Med. Sch., '07.....Hartford.
 Smith, Gilbert Tyson.....Univ. of Med., '97.....Stamford.
 Smith, Herbert Eugene, Ph.B., Yale, '79...Univ. Pa., '82.....New Haven.
 Smith, Henry Hubert.....Jefferson, '77.....New Haven.
 Smith, Newton Phineas.....P. & S., N. Y., '82.....Norwich.
 Smith, Oliver Cotton.....L. I. Hosp. Coll., '83.....Hartford.
 Smyth, Herbert Edmund.....McGill Univ., '84.....Bridgeport.
 Spencer, Elizabeth Conover.....Wom. Med. Coll., Pa., '03..Waterbury.
 Sperry, Frederick Noyes.....Yale, '94.....New Haven.
 Spier, Seymour Leopold.....Yale, '04.....New Haven.
 Sprague, Charles Harry.....P. & S., N. Y., '04.....Bridgeport.
 Standish, James Herhert.....Univ. N. Y., '95.....Hartford.
 Stanley, Charles Everett.....Univ. Pa., '76.....Middletown.
 Stanton, George Dallas.....Bellevue, '65.....Stonington.
 Stanton, John Gilman, B.A., Amherst, '70..Wurtzburg, '73.....New London.
 Starr, Robert Lytton, B.A., Trinity, '97;
 M.A., '00.....P. & S., N. Y., '01.....Hartford.
 Stauh, George Edwards.....L. I. Hosp. Coll., '93...New Milford.
 Stauh, John Howard.....L. I. Hosp. Coll., '99.....Stamford.
 Steadman, Willard George.....Bellevue, '74.....Southington.
 Steele, Henry Merriman, Ph.B., Yale, '94..Johns Hopkins, '02.....New Haven.
 Steiner, Walter Ralph, A.B., Yale, '92;
 M.A., Yale, '95.....Johns Hopkins, '98.....Hartford.
 Stern, Charles Seymour, A.B., C. C., N. Y..Bellevue, '91.....Hartford.
 Stetson, James Ehenezer.....Yale, '81.....New Haven.
 Stevens, Frank William.....Yale, '00.....Bridgeport.
 Stevens, Howard Granson.....Balt. Med. Coll., '04.....Cornwall.
 St. John, Samuel Benedict, B.A., Yale, '66..P. & S., N. Y., '75.....Hartford.
 Stockwell, William Myron.....Univ. Pa., '04.....Suffield.
 Stoll, Henry Farnum.....P. & S., N. Y., '02.....Hartford.
 Stone, Jay Stephen.....P. & S., N. Y., '65.....New Britain.
 Storrs, Eckley Raynor.....Jefferson, '90.....Hartford.
 Stoughton, Arthur Volney, B.A.,
 Pomona, Calif.....Univ. Ohio, '98.....Terryville.
 Stowe, William Harry.....Yale, '88.....South Norwalk.
 Stratton, Edward Augustus.....Univ. N. Y., '83.....Danbury.
 Streit, George.....Yale, '01.....Torrington.
 Stretch, James.....Univ. Coll., Richmond, Va., '02, Stafford Springs.
 Strosser, Herman.....Univ. Berlin, '84.....New Britain.
 Sullivan, Daniel.....Univ. N. Y., '97.....New London.
 Sullivan, Daniel Francis, A.B., Niagara
 Univ., '89.....Niagara Univ., '91.....Hartford.
 Sullivan, James Lawrence.....P. & S., Balt., '01.....Bridgeport.
 Sullivan, John Francis, B.A., Yale, '90...P. & S., N. Y., '94.....New Haven.
 Sullivan, Michael Joseph.....Cornell, '00.....Meriden.
 Sunderland, Paul Ulysses.....N. Y. Hom. Med., '94.....Danbury.
 Swain, Henry Lawrence.....Yale, '84.....New Haven.
 Swan, Horace Cheney.....Tufts, '03.....Hartford.
 Swasey, Erastus Perry.....P. & S., N. Y., '69.....New Britain.

Swenson, Andrew Clay.....Yale, '02.....Waterbury.
 Swett, Josiah.....Univ. Vt., '78.....New Hartford.
 Swett, Paul Plummer.....Univ. N. Y., '04.....Hartford.

Taft, Charles Ezra.....Harvard, '86.....Hartford.
 Tanner, Addison.....Univ. N. Y., '94.....Meriden.
 Tanner, Alfred Herbert.....Bellevue, '74.....Brooklyn.
 Taylor, John Clifton.....Univ. Mich., '91.....New London.
 Taylor, Maude Winifred.....Tufts, '05.....Hartford.
 Teele, Julia Ernestine, A.B., Tabor, '85....Wom. Med. Coll., Pa., '88, New Haven.
 Tenney, Artbur John, Ph.B., Yale, '77....Yale, '83.....Branford.
 Thibault, Louis Joseph.....Yale, '00.....Waterbury.
 Thompson, Emma Jane.....Wom. Med. Coll., N. Y. Inf., '96, Hartford.
 Thompson, George.....Me. Med. Coll., '89.....Taftville.
 Thompson, Harriet Adaline.....Wom. Med. Coll., Pa., '93, Bridgeport.
 Thompson, Whitefield Nelson.....Jefferson, '89.....Hartford.
 Tiffany, Frank Monroe, A.B., Amherst, '91..Univ. Pa., '96.....Stamford.
 Tingley, Witter Kinney.....Bellevue, '86.....Norwich.
 Tinker, William Richard.....Univ. N. Y., '80....South Manchester.
 Tolles, Burton Isaac, A.B., Yale, '01.....Yale, '04.....Ansonia.
 Topping, Jacob Reed.....Univ. N. Y., '82.....Bridgeport.
 Townsend, Charles Rodman.....Albany, '95.....Bridgeport.
 Townsend, Jos. Hendley, B.A., Yale, '85....Yale, '87.....New Haven.
 Townshend, Raynham.....P. & S., N. Y., '05.....New Haven.
 Tracey, William Joseph.....Univ. N. Y., '89.....Norwalk.
 Tracy, Andrew William.....McGill, '73.....Meriden.
 Travis, Catherine Hutchison.....Johns Hopkins, '03.....New Britain.
 Treadway, William Buckingham.....Univ. Mich., '83.....Howard, R. I.
 Trecartin, David Munson.....Dartmouth, '94.....Bridgeport.
 Tuch, Morris.....Bellevue, '06.....Hartford.
 Tudor, Mary Starr.....Wom. Med. Coll., Pa., '93, South Windsor.
 Tukey, Frank Martin, B.A., Bowdoin, '91..Harvard, '94.....Bridgeport.
 Turbert, Edward Joseph.....Balt. Med. Coll., '04.....Hartford.
 Turner, Arthur Robert, A.B., Amherst, '84..Univ. Paris, '94.....Norwalk.
 Tuttle, Charles Alling, Ph.B., Yale, '88....Yale, '90.....New Haven.
 Tyler, Heman Augustin, Jr.....Yale, '98.....Hartford.

Vail, George Francis, B.S., Villanova, '98..Univ. Pa., '02.....Hartford.
 VanStrander, William Harold.....Univ. Vt., '00.....Hartford.
 Variell, Arthur Davis.....Bowdoin, '94.....Waterbury.
 Varno, Henry George.....P. & S., Balt., '82.....Thompsonville.
 Verdi, William Francis.....Yale, '94.....New Haven.
 VonTobel, Albert Eugene, B.A., Yale, '96..Yale, '99.....Asheville, N. C.

Wadhams, Sanford Hosea.....Yale, '96.....Torrington.
 Waite, Frank Louis.....Bellevue, '88.....Hartford.
 Walsh, Frederick William.....P. & S., Balt., '85.....Rockville.
 Walsh, Thomas Patrick.....Univ. Vt., '02.....Middletown.
 Ward, James Ward.....P. & S., Balt., '95.....Hartford.
 Warner, Charles Norton.....Jefferson, '96.....Litchfield.
 Warner, George Howell.....Yale, '97.....Bridgeport.
 Wason, David Boughton.....P. & S., N. Y., '00.....Bridgeport.
 Waterhouse, Henry Edwin.....P. & S., N. Y., '02.....Bridgeport.
 Waterman, Paul.....Cornell, '02.....Hartford.
 Waters, John Bradford.....Univ. Vt., '90.....Hartford.
 Watson, William Clark.....L. I. Hosp. Coll., '97.....Bridgeport.

- Watson, William Seymour.....L. I. Hosp. Coll., '87.....Danbury.
 Weidner, Calvin.....Univ. Ind., '93.....Manchester.
 Weir, Janet Marshall.....Queen's Univ., Kingston, Ont., '91, Hartford.
 Welch, Edward Hubbard.....Yale, '76.....West Winsted.
 Welch, George Kellogg.....P. & S., N. Y., '78.....Hartford.
 Welch, Harry Little, A.B., Yale, '94.....Yale, '97.....New Haven.
 Welch, Thomas Francis.....Georgetown, '04.....Hartford.
 Welch, William Collins.....Yale, '77.....New Haven.
 Weldon, John.....Univ. N. Y., '83.....Willimantic.
 Weldon, Thomas Henry.....Univ. N. Y., '83.....South Manchester.
 Wellington, William Wintthrop.....Univ. Vt., '89.....Terryville.
 Wells, Ernest Alden, A.B., Yale, '97.....Johns Hopkins, '01.....Hartford.
 Wersebe, Frederick William.....Univ. N. Y., '98.....Washington.
 West, Redfield Benjamin.....Univ. N. Y., '79.....Guilford.
 Wheatley, Louis Frederick.....Tufts, '03.....Meriden.
 Wheeler, Frank Henry, B.A., Yale, '80.....Yale, '82.....New Haven.
 Wheeler, Lewis Hawley.....Yale, '97.....Westport.
 Whipple, Benedict Nolasco.....Yale Med. Sch., '07.....Bristol.
 White, Benjamin Walker.....L. I. Hosp. Coll., '86.....Bridgeport.
 White, Robert Creighton.....Univ. Vt., '89.....Willimantic.
 Whiton, Francis Henry.....Dartmouth, '72.....Manchester.
 Whittemore, Edw. Lancaster, Ph.B.,
 Yale, '92.....Univ. Va., '94.....New Britain.
 Whittemore, Edward Reed, A.B., Yale, '98..P. & S., N. Y., '02.....New Haven.
 Whittemore, Frank Hamilton.....Bellevue, '74.....New Haven.
 Wiedman, Otto George.....Univ. Pa., '05.....Hartford.
 Wight, George DeWitt.....Bellevue, '87.....Bethel.
 Willard, Frederick Buell, A.B., Univ.
 Vt., '97.....Univ. Vt., '00.....Hartford.
 Williams, Allen Hamilton, A.B.,
 Harvard, '91.....Harvard, '01.....Hartford.
 Williams, Marian Walker, A.B.,
 Radcliffe, '97.....Johns Hopkins, '01.....Hartford.
 Wilmot, Louis Howard.....Univ. N. Y., '91.....Ansonia.
 Wilson, Frederick Morse, A.B., Colby, '71..Harvard, '75.....Bridgeport.
 Wilson, James Cornelius.....Univ. Vt., '04.....Hartford.
 Wilson, William Patrick.....P. & S., Balt., '90.....Wallingford.
 Winchell, Alverd Ezra, A.B., Wesleyan, '57..P. & S., N. Y., '65.....New Haven.
 Winne, William Nelson.....N. Y., Univ., '97.....New Haven.
 Winship, Ernest Oliver.....Univ. Vt., '00.....New London.
 Witter, Orrin Russell.....P. & S., N. Y., '01.....Hartford.
 Witter, William.....Yale, '65.....Norwich.
 Wolff, Arthur Jacob.....Tex. Med. Coll., '76, Bellevue, '83, Hartford.
 Wooster, Charles Morris.....Univ. N. Y., '79.....Tariffville.
 Wordin, Nathaniel Eugene, B.A., Yale,
 '70; M.A., Yale, '72.....Jefferson, '73.....Bridgeport.
 Wright, Frank Walden.....Bellevue, '80.....New Haven.
 Wright, George Herman.....P. & S., N. Y., '94.....New Milford.
 Wright, John Winthrop, A.B., Amherst, '77..Univ. N. Y., '80.....Bridgeport.
 Wright, Theodore Goodelle.....Univ. N. Y., '65.....New Britain.
 Wurtenberg, William Charles, Ph.B.,
 Yale, '89.....Yale, '93.....New Haven.
 Young, Charles Bellamy.....P. & S., N. Y., '94.....Middletown.

Members noticing any errors or omissions in any part of this record will please inform the Secretary for correction in future lists.

